Industrial Finishing

Reg. U. S. Pat. Off.

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LET FACTS AND FIGURES SHOW ADVANTAGES

From the Editor's Desk

WHAT FACTOR in your industry today has the most important influence on sales? The sales manager of a large metal novelty manufacturing concern answers this question as follows:

"New finishes. News has been spread in the trade that many new finishes have been and are being developed. Almost the first demand a prospective customer makes is, 'Show me something new and attractive.' There is more of a race today than ever before between manufacturers to be first in offering not only new products but new finishes on old products."

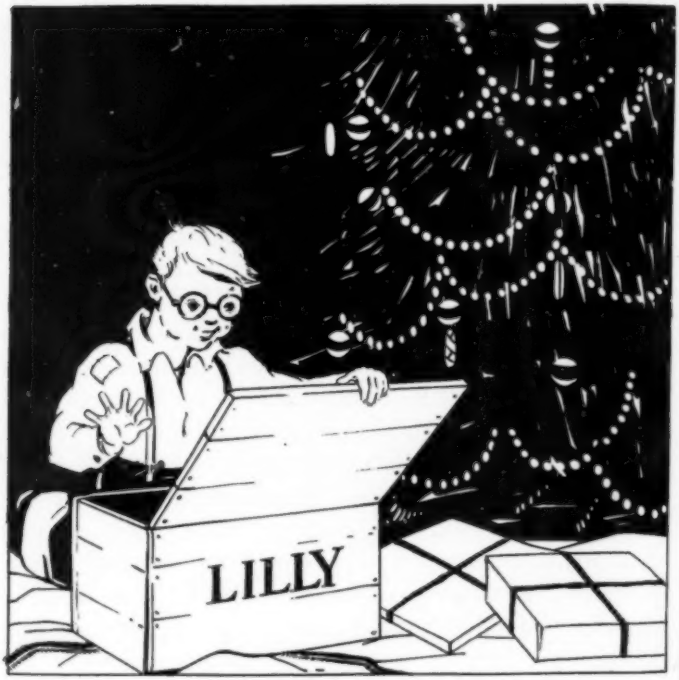
Isn't it more than probable that this sales manager has hit upon what is the most important influence on sales for 1931, and that this influence will reach far beyond the metal novelty producers and embrace the entire metalworking and woodworking industries? There is a decided trend toward new finishing materials and better methods. Although some of these materials and methods may not be productive of the unusual in appearance, nevertheless they are new in the light of economy effected through the reduction of time and labor.

In order to enter the greater conflict for the return of business, executives directly responsible for production and sales must be well informed. According to the new rules, success will depend not only upon the management's degree of knowledge, but on how quickly it is obtained and put into practice.

W. H. Rohr

Managing Editor

~ The Christmas Joy



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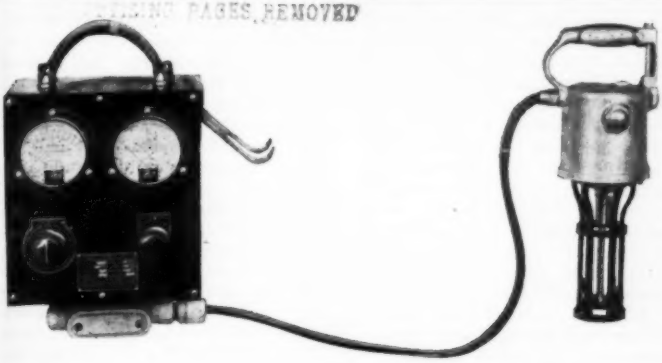

How to Measure Viscosity of Finishing Liquids

By
W. J. MISKELLA

Colorist and finishing consultant reviews some of the developments and requirements of instruments for measuring viscosity, and explains the operation and use of a late type direct-reading "mechanical hydrometer" or "electro-viscometer"

HOW MANY finishers have tried to read the degrees Baumé on a hydrometer as indicated in Fig. 1? A hard task wasn't it, just as difficult to determine that the actual reading was due to the capillary form of the liquid as it climbed up the stem of the small cylindrical glass tube? And for those who have never tried it, let me ask this question: How many have tried to read a mercury bulb thermometer on the hot-water furnace, for example—and about concluded there wasn't anything to read, although the water in the system was quite hot?

It must have been some of these difficulties that prompted the inventor of the new electro-mechanical device to get busy and improve upon this crude method of measuring the consistency of paints, varnishes, lacquers, and japans. Anyway, after many laborious trials and tests he succeeded, and we now have with us a direct-reading hydrometer, although the scientists have chosen the name "viscometer" for the new instrument.

Imagine the relief from uncertainty and poor light and often imperfect vision, when one simply inserts this scientific "egg beater" into a pail of paint and is able to read the viscosity on a direct-reading scale just as he does the ammeter on the dashboard of his automobile!

For years scientists have tried

to invent some sort of an instrument that would determine the viscosity and specific gravity of liquids both lighter and heavier than water—for these values are the basis of most laboratory research and must be determined accurately. Because of this fact Engler developed an instrument which is now standard for determining the viscosity of oil in Germany and other countries. This instrument works on the principle of comparing the viscosity of the material under investigation with that of water. There is a water jacket and a means for dripping the oil into a flask when the temperature of the copper, water-jacketed container arrives at any desired point.

Fig. 1—Trying to read a hydrometer

Engler figured that if water requires 52 seconds to deliver 200 cubic centimeters into the flask, and if the same amount of oil or other material under examination requires 130 seconds, then there is a ratio of 130/52, which is equal to 2.5. In other words the oil, or whatever it is, has a viscosity of 2.5.

Saybolt invented another elaborate laboratory device which became universally known as the Saybolt Standard Universal Viscosimeter, and today this instrument is used almost 100% in the oil industry. It is equipped with an electric heating, a steam-heating, and a gas-heating device. A stirring mechanism is included to enable the user to obtain the uniform temperature of the entire body of liquid under test.

Doolittle invented a torsion viscosimeter in which a steel wire is suspended from a firm support and fastened to a stem which passes through a graduated horizontal disc, this measuring accurately the torsion of the wire. The disc is adjustable so the index point reads exactly zero, thus showing there is no torsion in the wire to begin with. The sample of liquid is surrounded by a bath of either water or paraffin, according to the temperature at which it is desired to take the viscosity, for it must be remembered at all times that temperature has a great deal to do with viscosity; think of the semi-solidified oil in an automobile that has been standing several hours in the cold, for example.

Then another French chemist named Antoine Baume made himself famous by originating an arbitrary set of figures that has become popularly known as the Baumé Scale which, by referring to Fig. 2, you may quickly convert into terms of specific gravity. Incidentally, there is a difference in the starting point of the two Baume scales; that for liquids lighter than water starts at 10, while the other starts at zero.

Paints, varnishes, oils and solvents are, in general, lighter than water and require a hydrometer with the scale increasing upward from the bulb. On the other hand, some paints and lacquers are heavier than water and require the other type—a scale decreasing upward from the bulb.

In principle this new electro-mechanical device is like the Doolittle torsion viscosimeter in that the consistency of the material is measured indirectly by means of a simple resistance and capacity circuit, consisting of a specially wound rotor turning as an impeller in the liquid under controlled

electrical conditions. The load impressed on the submerged rotor-impeller, turning in the liquid under test, is read directly on a visual dial very similar to the ammeter on an automobile.

The device does not embody any new and startling theoretical disclosures, since it is a combination of well known instruments to produce a new and convenient tool —not a scientific instrument by any means, but one which will fit into the demand for something to intelligently measure the various liquids used and handled by finishers, painters and others.

Essentially it consists of four parts: (1) a part for attaching to a light-socket and for adjusting the current continually to a definite potential: (2) an electrically-propelled rotor driving an attached impeller and so designed that it will be extremely sensitive to the impeller load; (3) a means of inclosing the rotor impeller so the load is but little affected by such factors as the size of the liquid container, any swirling of the liquid, and the centrifugal force of the impeller; (4) a field current circuit consisting of a banked millimeter with special windings and scale.

The instrument is completely portable. It may be attached to any single-phase electric circuit. It may be inserted in the liquid to be tested, thus obviating the need for taking out small samples. It is vapor-proof and explosion-proof in spite of the fact that an electric motor design is used.

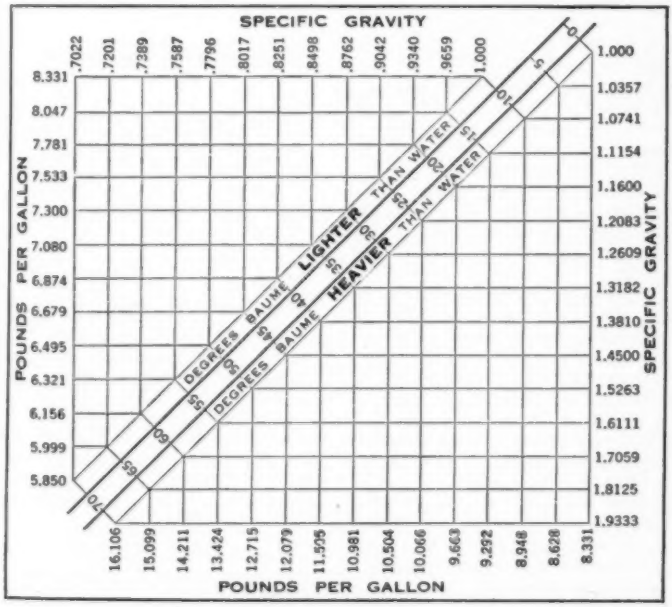

Fig. 2—Specific gravity conversion chart

There are no delicate working parts to get out of adjustment—no glass parts—and, most interesting of all, the user does not need any previous experience.

The operation of the instrument is simple. The switch connecting the device to the alternating current supply is turned on and when the user is ready to take a reading, the impeller mechanism is submerged to a definite depth—controlled by the frame around the impeller which also eliminates the effect of swirl. Next, the starting button on the handle is depressed. This starts the impeller motion. With the impeller turning and the button depressed, the potential is adjusted to a definite value as indicated on the visual dial.

In practice the units of viscosity, as read off the viscosity dial, may be used. However, for liquids having viscosities between .75 and 1.5, which includes most finishing materials, a curve or chart has been worked out to convert the dial reading into c.g.s. units of viscosity. Just as in a capillary viscometer or a bulb hydrometer, such calculations involve the specific gravity of the liquid.

It is especially interesting to note that as regards the effect of suspended solids, such as would be due to the pigments in paints and the like, a good agreement between the old and the new methods is produced. Therefore, this new instrument should have a welcome berth where the liquid to be tested is opaque, where the collection of sample to take to the central laboratory is cumbersome, where there is a demand for quick determination, and where there is a desire for improving the quality of the finish.

Nichols Air Heater Bulletin

The Nichols Products Corp., 12953 Greeley Ave., Detroit, Mich., has ready for distribution its illustrated Bulletin No. 108 about the Nichols 1931 Model air heater. This bulletin is 8½x11-in. in size and describes the construction and design of this unique heater.

Metal Specialties Plans New Expansion Program

The Metal Specialties Mfg. Co., 338 N. Kedzie Ave., Chicago, Ill., is putting into effect a well organized expansion program. To put this program across in a substantial way, the Metal Specialties Co., has secured the services of Mr. Stanly H. Twist as Sales Manager. Mr. Twist's long list of achievements in the past makes him exceptionally well qualified for such an undertaking. Mr. Twist, in conjunction with Mr. L. W. Golder, treasurer and general manager, is continuing the progressive policies of this company on a more extensive scale than ever before.

Beck, Koller & Co. Synthetic Resins

With a firm belief in the future of American industry, announcement is made of the incorporation of Beck, Koller & Co. under a Delaware charter. The new corporation is capitalized at $1,000,000, and takes over the patents, goodwill, and assets of the old Beck, Koller Co. of Detroit, Mich., which was an individually owned business.

Beck, Koller & Co., Inc. will continue to produce Beckacite synthetic resins and similar resinous products manufactured under their own exclusive protected processes. The main plant and general offices of the new corporation will be maintained in Detroit, Mich., (2-102 General Motors Bldg.), with a branch unit operating in Buffalo, N. Y. Warehouse stocks for domestic sales will be carried in New York, Montreal, San Francisco, and Los Angeles.

Mr. H. Reichhold will serve as President of Beck, Koller & Company, Inc., and associated with him on the directorate are his two brothers Mr. O. Reichhold and Mr. W. Reichhold, who are well known in European trade circles.

The Corporation's program for development and extension in Detroit calls for a new office building of brick and Indiana limestone, additional research laboratories and plant facilities, construction on all of which will be started immediately.

How
Where and
When to Use

Rolling Lacquers Spread With Rollers

By
W. F. ARDUSSI

Revealing some practical and interesting information about "rolling" lacquers and the equipment and methods used in applying this material to flat surfaces by the "inking roller" method

"In this article I have attempted to outline in a clear, brief manner the information of my experience. The subject is somewhat of a rare animal, and you will find its application at present scattered. There does, however, exist a real field for this kind of equipment, and the concern marketing this specialty should have great success."

ROLLING LACQUER and rolling lacquer equipment is for many finishing problems a real money saver. The modern lacquer superintendent should investigate this method of coating flat pieces and apply it in his plant where possible.

Rolling lacquers include the group that can be applied to a flat wood or metal surface by means of lacquer rolling equipment. In this article I will attempt to describe lacquer rolling equipment and rolling lacquers. I will point out a few representative uses and mention the advantages and limitations of this equipment.

Equipment

The typical machine used for applying rolling lacquers is very simple. It consists mainly of two soft-rubber rollers revolving in opposite directions and driven at constant speed by an electric motor. The lower roller revolves in a pan, the top edge of which is level with the axis of the roller. If we will think of an ordinary laundry wringer with one third of the area of the lower roller immersed in a pan, we can easily form a mental picture of this apparatus.

The rolls on this machine may vary from 2 to 6-in. in diameter, depending upon the pieces that are to be finished. The motor is connected to the rolls by belt, chain, or gear reducer. The power consumption is very low because practically the only resistance to overcome is that due to the lower roller revolving in the viscous lacquer.

The length of the rolls (consequently the width of the machine) is governed by the width of the flat pieces to be coated. Any width can be accommodated that can be handled at the exit of the machine without disturbing the wet surface.

The framework is constructed of light angle iron—bolted or welded together.

Lacquer is fed into the supply pan beneath the lower roll—either continuously or intermittently—from an elevated storage tank.

This combination of apparatus combines effective space utilization with design, so coordinated as to make continuous production a very easy matter. The lacquer storage tank can be of almost any capacity and, once it is filled, the problem of lacquer supply may be forgotten until the tank has been emptied.

Lacquer

Rolling lacquer is a much heavier product than the spraying lacquer that is reduced 50/50 with thinner. It is of the order of dipping lacquer, such as is used in dipping broom handles and the like. We might anticipate that a heavy-bodied material would be used because our rolling is very similar to a dipping process. The difference is that in dipping, the excess lacquer runs off by gravity or is scraped off, whereas with this machine, the excess is rolled off in a horizontal direction.

This heavy lacquer has the qualities of low percentage of volatiles and high percentage of solids. Inasmuch as finishes with this machine are not usually applied on products that can warrant the cost of polishing to produce luster and gloss, these lacquers usually come in a high gloss or eggshell finish.

The problem of cutting lacquer at the finishing plant is eliminated with rolling equipment, because the lacquer comes from the manufacturer "ready mixed," and can be immediately placed in the storage tank.

Applications

Lacquer rolling equipment can be used in coating Venetian blinds, rulers, pre-finished flooring and many other similar products.

An example of a typical application is in connection with the manufacture of Venetian blinds on a large scale. These slats are given their first coat in the lacquer roller; the second coat is sprayed. This setup combines the advantages of the low cost in the rolling operation with the superior finish obtainable by means of spray gun in the second coat. Blinds have been made according to this schedule that are comparable to those formerly obtained with two spray coats. In addition, substantial saving of material was shown, accompanied by an increased volume of production.

Advantages; Limitations

When it is feasible to apply lacquer by rolling, the operation is always attended by lower handling costs than with any other kind of finish application. The reason for this is rather obvious. The roller coats both sides of the piece simultaneously, and the operation of finishing is straight line and continous. Then too, the space used by the lacquer roller is very small compared to the volume of production.

Because the rollers cannot thoroughly cover the edges—especially of thick sections—excess accumulations, or what is known as "fatty edges," sometimes occur in the rolling operation. This may necessitate a light sanding after the first coat, with the second coat applied with a spray gun. This procedure is especially recommended wherever cost is subservient to quality. In no sense is this a minimization of the advantages of the roller—whose good points have been mentioned—but, I believe, there is

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THE ZAPON COMPANY

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still need for much improvement on this machine to make it produce work comparable to that obtained by a first class spray operator.

Summary

Summing up briefly, it can be said that where cost is a primary factor, "rolling lacquer" can be used to good advantage on flat pieces. Where a first class finish is desired, the ground coats may be applied with rolling equipment and the final coat or coats sprayed.

Finally, although there are now but limited types of rolling equipment available to the finishing industry, the mechanically minded foreman finisher can adapt the various types to best suit his needs and take advantage of the attendant money savings and increased volume of production.

Pearl Essence — A Finish

By
*H. E. MATTIN**

Research chemist tells about the discovery of pearl essence and explains what it is, how it is prepared, what it is used for, what strikingly beautiful effects it produces in connection with certain colors and how it is applied as a finish

UNDERNEATH the scales of a fish is a small crystal chemically termed guanin. It is the crystal one sees floating around in the water when the fish is scaled. Locked up in this crystal is one of Nature's secrets of making beautiful finishes. Merely an exudation, the fish builds this crystal up in the same beautiful structure as a peacock does its tail, or an oyster its pearl.

Man, seeing this tiny crystal floating in the water, turning over and over again as though propelled by some unknown electrical forces, eagerly seized upon it as a source of artificial beauty. Crystals were collected, separated from the fatty matter, dehydrated, and incorporated into lacquer; in this condition they came into the market as "Pearl Essence" or Essence d'Orient.

This lacquer, when properly applied to a glass bead, makes the artificial pearl—a product of such soft lustrous beauty that only the initiated can distinguish it from the natural.

With much success this wonderful finish has been applied in other directions, and only its former high price prevented wider adoption. In more recent times, due to economies of production, the price has dropped to a fraction of its former value so that to-day "Pearl Essence" or Triple X paste is now being used extensively on such a wide variety of objects as flashlights, caskets, leather, furniture, moulding, artificial flowers, plastic figures, store windows, etc. Even it is now being experimented with for use on automobiles.

The essence generally comes in-

*With Mattin Laboratories (Research Chemists), 220 25th St., Brooklyn, N. Y.

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to the market as a heavy paste of nitrocellulose and amyl acetate. One manufacturer has solved the problem and has it now incorporated in cellulose acetate, turpentine gums, and solvents such as toluol, chlor-benzol, etc., carrying ethyl cellulose as the lacquer.

The paste is sold by the pound and should contain the standard amount of 50 grams of anhydrous essence to the pound. This concentrated paste is incorporated in the lacquer to be used—generally from four to five ounces of paste to a gallon of lacquer, depending on the finish desired.

Colors and Tints

Since only one coat of finish containing pearl essence is applied the cost is rather economical for the result achieved. In applying it, care must be exercised in the choice of colors. It might be a standard rule to follow that the nearer to the surface the pearl essence coat is, the better the effect.

With light colors and tints, the effect will be universally successful. With heavier shades, discretion must be used; for instance, over a jet black the shade seems to be greener, etc. This change in color appearance is due to the light effect of the crystals, and not to any chemical action as is generally the case when colors are thrown off by resins, solvents, etc. One must merely realize that he is dealing with a powerful pigment as regards its affect on the human eye, even though the amount used is small.

Multi-Color Effects

For instance, I had my car sprayed as an experiment. After the proper basing, a deep gray color was applied. This was topped off with Triple X paste and finished clear. The result was a beautiful powder blue. At the curved surfaces, where the essence shows up best, the effect is astonishing. From a distance of 50-ft. or so, the radiance of color is remarkable. On a close-up the car seems quite normal. Generally in traffic tie-ups, someone inquires as to the nature of the color.

For interior work, where tinting with dyes is permitted, it goes very well mixed directly with the dye—with the possible exception of nigrosine which seems somewhat bronzy. However, the casket people seem to have overcome this defect.

Quite recently, in the laboratory, we had a piece of fishing tackle striped with five or six colors and then finished off with pearl essence lacquer. Some time ago we had an order to finish off a Fifth Avenue department store window in New York City with pearl essence to simulate an aluminum effect they were fond of. It is surprising what splendid effects can be achieved.

For Dipping; Spraying

Its application is the same as with any other lacquer. Unquestionably, dipping gives the best results, and for small objects I recommend it. Spraying, for best results, should be carried out under slightly reduced pressures.

As regards durability, the pigment is as durable as the lacquer carrying it, and it imparts to the lacquer the same effect as any other pigment. It stands the light well and will weather with the carrying film. Hardly any special precautions need be taken with it, once it is incorporated into the applying lacquer.

It has the same degree of tolerance for thinness and, in general,

Neutralize Sappy Streaks with UNI-STAIN

UNI-STAIN makes sappy streaks in gum disappear. It also uniforms birch and any pieces not accurately matched. Keeps its color on end grain. Dries in three hours. Send for panel, or order five gallons at drum price.

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CHICAGO

Shellac is Now Economical

Lowest prices in years now make pure shellac again the favorite

mixes with other materials the same as pyroxylin. For any special use the finisher would do well to refer back to the manufacturer, as the manufacturer's experience seems to have overcome quite a number of problems.

With its present low price and remarkable finishes achieved by its use—and considering the hardly added technique required for its application—it should find, in this highly competitive market, an immediate and more or less general adoption.

New Methods, Materials and Equipment

Throughout the past year rapid strides have been made in the development of more efficient and economical industrial finishing methods, materials and equipment. Some years ago, if anyone had even suggested that there would be such revolutionary changes from what was then employed, he would have been ridiculed. I anticipate even greater accomplishments along this line.

In the equipment line alone there is a tremendous list of new and improved devices—metal-cleaning apparatus, spray guns, automatic spray equipment, mechanical sanding, dipping, rubbing, striping and polishing machines, conveyors, paint mixers and agitators, stencil outfits, etc.

Conveyor systems are employed chiefly in connection with bake finishing, although they are also applicable for service where air-drying finishing materials are used. Many concerns, whose finishing rooms would be greatly benefited by the installation of conveyors, hesitate about making the initial investment, when as a matter of fact a thorough investigation would prove that the equipment could easily pay for itself during six months' service.

As to materials, there unquestionably has been a big change. It amuses me now when I see how popular crackle lacquer became after so many people declared that lacquer was doomed to complete failure as a finish.

An outstanding example of new materials has been the development of lacquer sealers or sanding sealers, which have become so popular in wood finishing. One of these lacquer sealers has a glue base and is especially useful for painters and decorators. There are many fine quality finishing materials on the market today, and they are being constantly improved.

In this highly competitive game of industrial finishing, costs must be kept down and quality improved. It is imperative that during dull seasons manufacturers should be busy experimenting, investigating and capitalizing on any new ideas in methods, materials and equipment, so as to be able to meet competition on an equal basis when retail buying becomes more active. After all, results are what count, and it matters not how much or how little the price may be, the ultimate finish is the most important feature, from a standpoint of sales, in the successful marketing of any product.—W. R. Beutin.

Dupont's New Auto Polish

A new product, especially suited for cleaning very dull and badly weathered automobile finishes, has just been announced by E. I. DuPont de Nemours & Co. This product is of the liquid type and is called "No. 7 Heavy Duty Polish." It contains special solvents for softening dirt film, and has an abrasive sufficiently powerful to remove chalked pigment easily and rapidly.

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4. Remain clear, flexible and lustrous.

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To test compatibility, make up a solution of pyroxylin, resin, Lindol and solvent only. Note its clarity.

To test solubility, add non-solvent to a Lindol plasticized lacquer. Note the quantity necessary to cloud the film.

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LACQUER MANUFACTURERS: Send for sample of Lindol and technical data.

CELLULOID CORPORATION

Chemical Specialties Division

10 East 40th St. **New York City**

Finishing New Reproductions of Rare Woods

By
P. C. BARDIN

Describing the finishing process employed on cabinets faced with some real wood in combination with areas bearing remarkably true reproductions of expensive imported woods—including an explanation of how the reproductions are applied

AS FAR BACK as our knowledge of history extends into the life and habits of man, he has ever been seeking the beautiful. The age in which he lived or the race to which he belonged mattered little; he adorned his possessions according to his intellect. And man has not changed.

Within the scope of our lives we have seen various attempts made to reproduce the beauty of color and grain figure of fine woods on both metal and wood. Many of these have been discarded because they were lacking in verity. Due to its lack of true simulation, one of these early processes practically eliminated the demand for furniture built with one of our sturdiest hardwoods.

Today one of the latest methods of faithfully reproducing the colors and grain figure of rare woods is being used by a number of manufacturers of radio cabinets and other furniture. One concern I have in mind is using this method successfully to simulate the burls of thuya, madio, Carpathian elm, amboyna, French and Mexican walnut; also zebra wood, ebony, rosewood, and harewood. These special transfers or decalcomanias* are made of oil pigments and clear lacquer with the equivalent of four spray coats of lacquer on the face side or exposed surface.

The process is simple. Let us consider the radio cabinet shown above. The top and end panels are of plywood construction with American walnut face veneer. The front, with the exception of the instrument panel, is solid gum wood. After the end panels and

*While the manufacturer supplying this product objects to having it called "transfer" or "decalcomania," we know of no other common name or term for it.

The only

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OFFICES—WORKS—LABORATORY

Richmond and Tioga Streets

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the front side and front center panels (solid) have been machined (with the exception of the routing on the latter) they are delivered to the finishing room.

A coat of clear lacquer is sprayed over an 8-in. area at the lower or base end of the end panels, and over the entire surface of the front center and side panels. This coat is allowed to dry from one to two hours, after which the pieces are taken to the work benches where the special graining transfer is applied.

The operator submerges the special transfer in a "welding cement" and immediately applies it to the lacquer-coated surface of the wood. The workmen have various sizes and shapes of hand-operated, rubber rolls which they use to roll the transfer—rolling out any air bubbles and giving it sufficient and uniform pressure to adhere to the wood. Complete adhesion takes place immediately. After rolling, all surplus moisture is wiped from the paper-coated face side of the transfer; then the operator uses a hand sanding block to touch up the edges of the applied transfer working with a slightly inclined down stroke.

After drying about an hour, the end panels proceed to the assembly shop. The front center panels go to the router for the groove cuts. Even in this machining operation, where the routed grooves cut the transfer to a feather edge, no trouble is experienced, showing conclusively how complete the adhesion is between the special transfer and the wood.

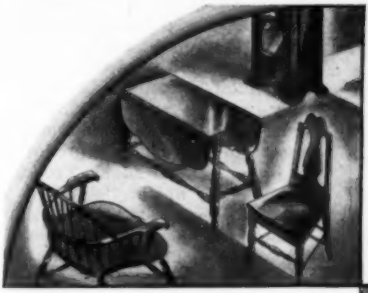
The front side panels are run through a drum sander which sands the two long edges of the applied transfer to a feather edge and smoothes the solid wood edges of the panel, leaving the paper-coated transfer intact in the depressed or sunken portion of each panel. The front side and center panels then proceed to the assembly shop.

After the cabinet has been assembled, clear water is used to remove the tissue paper coating, and the transfer is washed with clear water. The cabinet is allowed to air dry over night; next morning it is then taken to the staining booth and stained. There is no masking of the applied transfer as its surface doesn't take the stain. Filling, cleaning and drying follow, after which the cabinet goes to the spray booth where the edges of the top, posts and front panels are highlighted. After drying, the cabinet receives a coat of sealer and two coats of clear flat lacquer sprayed over the entire cabinet, including the applied transfers.

While the application of these decalcomania transfers is simple, certain precautionary measures are necessary. If the solid or plywood is an open-grained wood, it must be thoroughly filled, cleaned and dried before applying the clear lacquer foundation coat. The surface of the wood upon which the transfer is to be applied must be perfectly smooth and free from all saw or knife marks.

Any imperfections in the wood or traces of poor manufacturing, or a high moisture content in the solid wood panels will result in faulty work in connection with the application of the transfer. As a matter of fact, just as much attention is necessary in the selection and preparation of the wood to receive the transfers as though genuine veneers were to be laid.

If the ordinary rules of good manufacture are intelligently followed, the work produced will be satisfactory, both from the stand-



TEGLAC makes better FURNITURE LACQUERS

Lacquer finishes for modern furniture receive much abuse. Whether they stand up under this or not depends largely upon the lacquer ingredients. From the sanding sealer to the final finish, high gloss or flatted as you prefer, Teglac is the logical choice.

When makers formulate with Teglac they note how compatible it is with Nitrocellulose. Lacquer users note how it improves working qualities . . . note its freedom from gum blush . . . its almost marproof hardness . . . and its lustrous depth of finish. These are the appearance values that sell Teglac-finished furniture.

Teglac can be used in either clear or pigmented lacquer. Wherever demand calls for better finishes for furniture there is need for Teglac. Let us send you or your lacquer maker the full technical data. At the same time, if you are interested, we will send information on our other lacquer products: Rezyls, for outside endurance; Balsams for plasticizing; and Ethyl Lactate, a high-boiling solvent.

Industrial Chemicals Division

American Cyanamid Company

535 Fifth Avenue New York

Sole distributors for Nitrocellulose manufactured by our subsidiary, the American Powder Company

point of durability and appearance, for the beauty of the finished cabinet does not come through skill of imitation, but rather as a result of perfect reproduction of the rare foreign woods.

The "intricately carved" instrument board or main front panel is a pressed composition material which resembles wood. The color of this "pressed wood" or composition material is rather dark, and it is finished separately before assembly in clear flat lacquer. This panel merely slips into place and may be removed at will.

Heat Resisting Lacquer Enamels

Among the items of recent development in the lacquer industry is a basic lacquer enamel developed for use on gas, oil, and electric heaters. This material is the result of extensive research work and is adaptable to any article requiring a rapid drying protective finish that is heat resistant.

To secure the most satisfactory results on stoves, a paint primer reduced with a paint reducer to the proper consistency for application should first be applied onto the metal sheeting and baked for about one hour at 275° F. to 325° F. A bake at this temperature should permit heat-resisting lacquer enamels to be applied directly over the paint primer. However, it is necessary that the paint undercoat be constructed to permit the lacquer enamel application without the action of the lacquer solvents penetrating this film and causing the lifting of the paint undercoat.

The heat resisting lacquer enamels are formulated to give solid coverage in one spray application. These enamels usually require 100% reduction with the proper reducer. However, there are available enamels that are ready for spray application, which is merely the angle of solid matter versus heavier-bodied products, but either enamel should produce a satisfactory finish.

These heat-resisting lacquer enamels produce a tough, elastic, and durable film of semi-gloss sheen. The sheen, however, can be controlled by the manufacturer of the enamels.

In some cases the baking of paint primers has been eliminated, and the solid covering enamels have been applied directly onto the metal surface with satisfactory results. These enamels are resistant to 300° F. of heat for a period of from three to four hours. They maintain their strength of film, do not soften, and any discoloration noted has been very slight.—J. C. Alsee.

Clear thinking demands facts.

Chemistry Book Catalog

The P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa., has published a catalog entitled, "Modern Books on Chemistry." This catalog contains 24 pages, 6x9-in. in size and includes reviews of books for the works chemist, and textbooks for schools and colleges. This catalog is indexed according to authors and the books are grouped according to similar subjects.

North Bergen Varnish Corp. Employs Representative

Mr. A. H. Gabel of Rochester, N. Y., has joined the North Bergen Varnish Corp., (No. Bergen, N. J.) makers of "Bergo" lacquers, varnish and enamels, effective December 1, and will represent the company in Rochester, Buffalo, Syracuse, and vicinity. He will make his headquarters at No. 2 Rhinecliffe Drive, Rochester, N. Y.

Filling Surfaces to Be Lacquer Finished

When wood is to be lacquer finished, it is important that it first be properly filled to condition the surface for a fine finish. The filler used must be of a non-bleeding color, free from soaps, borax or any other substance that will cause lacquer reaction; otherwise, in time, the finished surface will show gray pores.

I suggest about 48 hours drying time to permit the filler to dry hard before the application of lacquer, as a perfectly dry surface is absolutely necessary for this type of finish. This drying time could be materially reduced for a varnish finish.

To prevent gray pores in the filled surface, the filler for use under lacquer should contain a sufficient amount of coloring matter and should be mixed in the proportion of 12 to 14-lbs. of filler to one gallon of naphtha, depending on the type of wood to be filled. The more open the wood pores are, the heavier the filler should be. In mixing the filler I suggest adding about ½-pint of the oil binder, which covers the filler in the original container, to each gallon of filler mixed. This will promote smoothness in working the material.

When thinning filler, be careful to avoid thinning too large a quantity, as any left over will become fatty and slow drying. It is not advisable to use filler that has been thinned and left more than 24 hours. During the filling operation, the filler should be stirred frequently and repeatedly to prevent solids from settling to the bottom of the container.

Care in handling paste filler in its container and mixing pot will prevent many troubles. It is essential that some of the oil binder be retained over the surface of the filler in the original container to prevent hardening of the material. When a package is opened and the contents are exposed to the air, the oil will evaporate, causing the top layer to harden and oxidize in the same manner as when it is in the pores of the wood; for this reason the filler should not be left exposed to the air; the container kept tightly closed.

If filler is not to be used immediately after purchasing, it is advisable to buy it in metal containers, as wooden kegs absorb the oil binder and occasionally allow some of the oil to leak out between the staves. Filler subjected to these conditions is deficient in oil binder, needs more thinner, cleans off too thin and is liable to cause gray pores on the finished surfaces.—W. E. Warner, Essex England.

New materals developed by scientific research have revolutionized the varnish industry to the great advantage of producer and consumer.

Lacquered Wallpaper

After a series of experiments and tests extending over a number of years the Du Pont Co. has developed a cellulose coating for wallpapers which apparently does away with defects that previously have been found to be inseparable from the treatment of these fabrics so as to make them washable. The new cellulose coating gives the washable wallpaper the following properties: First, it resists ink, dust, dirt, soot, grease, finger marks and other ordinary stains; second, it will not curl; and third, it is not shiny. The appearance of the washable wallpaper, when coated with new cellulose finish, is exactly the appearance of an ordinary wallpaper, it being impossible to discover from looking at it that it has ever been coated with anything.

Metal: Plywood: Fabric . . . Cleaning: Conditioning: Finishing.

Refinishing Fokker Aircraft

By
G. L. HARDY

Material and routine specifications included in cleaning, conditioning and finishing the metal, plywood and fabric surfaces of modern aircraft in service for Western Air Express and subsidiaries

"I hope and trust this story of the finishing methods of Aero Corporation of Calif., and the Western Air Express will prove of real value to some of the readers of INDUSTRIAL FINISHING *magazine.*

"We painters of this company are well pleased with the fact that just as much care and choice is allowed to go into our painting methods as is exercised in the care and maintenance of the most delicate and costly parts of the ship's engines and controls.

"After all, the biggest part of successful painting is the cooperation of officials and superintending heads of the various departments. This, to me, covers everything that is necessary to the success of any shop. It means just as much as having the finest of materials and equipment, which we also have.

"The above statement plus careful preparation and application is the only secret of fine painting, as we have not carefully prepared unless we have planned and chosen our materials with precaution, and applied them with due thought."—

G. L. Hardy

HERE IS A SHIP that offers an exceptional variety of surfaces for the finisher to show his versatile ability, as its construction includes fabric, plywood, duralumin, aluminum, steel and wood—in fact just about everything that can be combined in the manufacture of an airplane. Finishing operations call for paint removing, sandblasting, doping, spraying, brushing and major finishing all the way through.

A ship of this make calls for perfect cooperation from all departments. If this is not provided, the finishing costs alone may run $200 or more than is necessary. With weather conditions and drying time to fight, plus the customary rush on odd and forgotten parts, this statement can be readily proved.

If the foreman cannot stop the odds and ends of parts drifting through the paint shop, it will be wise to appoint one man to take charge of just such details. However, the foreman should get interdepartmental cooperation and

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Look at the finished product, note the time required and the costs of material. On every count you'll cast your vote for Murphy Waterproof Mixing. Hundreds of companies are using it to turn costs down and quality up.

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Famous for 65 years among architects, master painters and makers of products requiring a fine finish.

Air-drying and Baking Varnishes
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thereby eliminate the unnecessarily bad habit of sending through assemblies that are "half done" or incomplete in number of parts. For successful and economical results, this is the only basis on which to work.

When working on ships of this make, we always bear these cardinal points in mind; and when the time comes to check the material requisitions and labor costs, the dollars saved and the splendid results obtained readily manifest themselves. This routine does not stop here, as we trace the methods of application into the maintenance of the finished ship, until it is ready to come back into the shops again.

Metal Cleaning

Beginning with the Fokker skeleton, from which the old covering and plywood has been removed, we are ready to inspect all the frame work and to sandblast if possible. If this cannot be done, all welded joints should be stripped of paint, and all rusty places should be sanded perfectly clean.

With due care, this operation can be carried on as the welders do their work, the riggers true up the bays, and the woodworkers attend to their details. If any of these workers should interfere with the paint work, the cowling can be stripped for the metal workers to check for dents, cracks, etc.

It is a very wise move to make sure that the cowling or metal parts are stripped before any welding or soldering is done—so as to avoid the difficult task of removing burned spots of clear lacquer, as this is next to impossible on spot-buffed or scrolled cowling.

The fuselage tubing should be primed as soon as possible so that the dope-resisting paint can be applied, dried ready for covering, and kept out of exposure to the elements and corrosive media.

Except for scrolled surfaces, sandblast whenever possible, as even the best of removers have at times a tendency to pull through wet. Furthermore, sandblasting is not only speedy, but the finishes on a sandblasted surface are by far the more durable, so that future maintenance expense is cut to a minimum and present routine is better established.

If remover is used, rinse with commercial (not aviation) gasoline, and follow with an alcohol rinse. A very good plan is to use a distillate gun or the cone spray on the spray gun, and to wash carefully around all grommet holes, seams, and rolled edges.

A Fokker skeleton from which the old covering and plywood have been removed.

Wishing You a Merry Christmas and a Prosperous New Year

Brevolite Lacquer Company

(Formerly Waukegan Chemical Co.)

North Chicago, Illinois

"Values That Endure"

No attempt should be made to salvage the alcohol or gasoline. If the rinse is thorough, wet spots in the finish will be very rare.

Dry-baking, if the company possesses an oven, is a sure cure for wax and grease—if this procedure is adopted before the cowling is refinished. Try this at 200° F. for one hour. If the oven has a heat regulator that is hard to reset, the cowling may be run in and fouled at temperatures as high as 400° F. or a trifle over for an hour or more, but this lengthy time is not necessary, and is a useless waste of heat. On scrolled cowling, remove the clear lacquer and neutralize, if needed, before sandblasting the paint from the inside.

When possible, I prefer to use methyl or C. P. acetone, or other wax-free solvents that have good stripping qualities. This calls for speed in handling, but it is the practical way as it eliminates one operation and the needless use of about eight gallons of alcohol, and about the same quantity of gasoline neutralizer for a 3-motor or 4-motor ship. Where the finish has been baked on from the heat of the engine, paint remover is the only thing—other than re-scrolling.

After the cowling has been returned from the metal shop, care must be taken to wash off all grease, finger marks, soldering flux, and any foreign substance that might have adhered to the metal. Any small particles of lacquer that have stubbornly stuck to the cowling may be removed by an additional soaking of remover followed by the use of a circular shaped small pad of steel wool in a rotating motion on the scrolled spots. Incidentally, when working on the cowl panels that are curved, be sure to avoid applying excessive weight from the hands or body, as this will easily bend them out of shape.

Departmental cooperation is imperative here. The metal-shop foreman should see that his men do not spill acid or flux on the cowling, as these spots are next to impossible to eradicate. A steel wool pad is about the only solution. Be sure that all cowling has been refitted after repairs before starting to refinish. A little care on the part of the foremen of all departments, exercised at the proper time, will save hours of labor and grief for the painters.

Primer; Color Coats

If the primer on the inside of the panels is to be baked on, this must be done before the application of the clear finish coats on the reverse sides, as these coats will not stand the heat necessary for the baking of the primer.

Finish the inside of the panels with two coats of color over the primer coat. Mix in about one-fourth or one-fifth clear lacquer primer in both applications. The outside of the cowling should have at least three coats: one thin uniformly-applied coat of clear primer, and two medium thin coats of clear finishing lacquer. If the clear lacquer is a duplex primer and finish, use three coats and apply in the same manner.

Coats applied too heavily are pebbly and unsightly; on the other hand an insufficient amount of lacquer does not properly fill the scrolling, and this means a finish that is difficult to clean for the men who have that end of the maintenance to care for.

If the outboard motor catwalks and strut streamline covers are put on before the ship is ready to test-hop, it will be a good idea to cover these with paper to save them from being scratched and

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Measures of economy, adopted for the recovery of business, may be based either on hope, or on practical considerations. We prefer the latter—therefore we are cooperating with our customers on the basis of practical measures, believing this the key to better business for all concerned. We are convinced that *VALUE in finishing materials* is the most *practical* consideration of to-day, in the final steps of production. Each Zeller grade of lacquer or lacquer enamel is built not to price but *to accomplish a given job.* Having built the grade we then and only then proceed to meet competitive price limitations. Greater coverage, greater building properties, greater flexibility or durability—no matter what the given requirements of your job, Zellac grades will meet them and at the same time reduce your finishing costs. That's VALUE! Let us prove it to you in a trial order.

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gouged and made unsightly. The paper covering should be taped very securely.

A very practical color idea for inside of the cowling is to select a shade that can be used on the longerons, center motor mount, cabin chairs, lavatory and baggage compartment. A soft pastel shade of grey, off of the lead cast, is very serviceable and pleasing.

(To be continued)

Aluminum Finished Electrical Equipment

For many years it has been customary to finish all electrical equipment used back of switchboards, especially central telephone exchange boards, in dull black. Just why this color was first selected is not known, except possibly because it matched the darkness generally found back of these boards.

Greatly improved conditions now prevail since the electrical equipment manufacturers are finishing these metal parts in baked aluminum finish. This adds much to the appearance of everything back of the switchboards and, what is most important perhaps, it aids greatly in reflecting light in what would otherwise be dark surroundings.

All galvanized metal parts receive a spray coat of heavy pigment oil-base primer before they enter the aluminum room.

Those parts not having soldered joints are sprayed with aluminum paint made up in the proportion of 1½-lbs. of aluminum powder to one gallon of high-temperature baking varnish. Then the finished parts are run through a baking oven where they are subjected to 440°F. for 1½ hours. The second coat is applied and baked the same as the first.

Such parts as relay coil covers, having soldered joints, receive spray coats of aluminum paint, and are placed on carrier trucks which, when loaded, are placed in a "batch-type" oven and subjected to a baking temperature of 330°F. for three hours. The idea of this lower-temperature baking is to prevent the solder from melting, and the same excellent results are accomplished through the longer baking period.

The usual metal-cleaning operations precede all priming and finishing coats. Since rust is seldom found on these parts, washing in a chemical cleaner to remove any oil or grease, and drying, are generally sufficient.—P. C. Bardin.

Unit Heater Catalog

The Buffalo Forge Co., Buffalo, N. Y. has ready for distribution its Catalog No. 469, which describes and illustrates five different types of unit heaters. This catalog contains 20 pages, 8¼x11-in. in size.

Hercules Representative Returns From World Trip

After a seven month absence, Paul Mayfield, representative of the Cellulose Products Department, Hercules Powder Co., Wilmington, Dela., has returned to Wilmington following an around the world trip, the main object of which was to look after Hercules interests in New Zealand and Australia. Mr. Mayfield represented the naval stores and cellulose products departments in the interests of Hercules export business in the antipodes. He reports that Australia is suffering a business depression similar to that in this country, but that the western continent holds wide possibilities.

He returned by way of Ceylon and Bombay and flew from Marseilles to Paris, thence to London. He also visited Hercules' distributors in Holland and Germany. During recent years, an increasingly larger proportion of business has been done by Hercules Powder Co. in foreign lands.

Ours is not a ONE TIME *product*

We endeavor to establish, with each of our customers, a liaison that is lasting--an association that abides. Our product reflects this policy. Every bit of finishing material that leaves our plant must fulfill a two-fold duty. First, it must produce the finest finish possible for the product to which it is applied. Second, it must create, in the customer, a reason for re-ordering finishing materials from us. We never forget that our success depends on customers' satisfaction. So we manufacture a product fit not only for "one time" use, but for "all time" use. Isn't that the kind of finishing material you want--and need?

The ROCKFORD VARNISH *Company*

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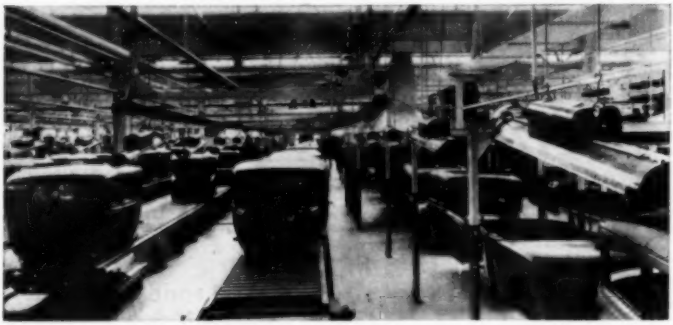


"Their various conveyors are said to be the most modern ever installed in any plant."

Latest Finishing Equipment in Ford's Long Beach Branch

By
ANSON GUILD

Heralded by Ford Motor Co. executives as the most efficient and up-to-date automobile assembly plant in the world, the Long Beach (Calif.) unit, with its ultra-modern finishing and preparation equipment, is therefore of more than passing interest

THE NEWEST and most modern assembly plant of the Ford Motor Co. has recently been completed at Long Beach, Calif., a suburb of Los Angeles, at a cost of more than $5,000,000. The plant has deep water frontage at Los Angeles-Long Beach harbor, as well as adequate rail and motor facilities. The main structure is 301x920-ft. with a two story warehouse 440x86-ft. There is a separate paint and oil house 61x113-ft.

Henry Ford is generally credited as being the father of straight line production in America. In his factories, the work has always moved to the man, instead of the man moving to the job. The principle of that economical plan now permeates all industry, and in the Long Beach plant of the Ford company it is achieved by means of an elaborate system of electrically-operated mechanical conveyors and a paint plant setup that is said to closely approach the ideal.

The Ford production principles of speed and economy, plus durability, operate throughout the paint processes at this institution. Every motion is devoted to these three items which Ford executives consider so essential to the success of their enterprise. These factors are perhaps as well exemplified in the Long Beach assembly as in any factory anywhere. They are the result of years of study and practice in a field which

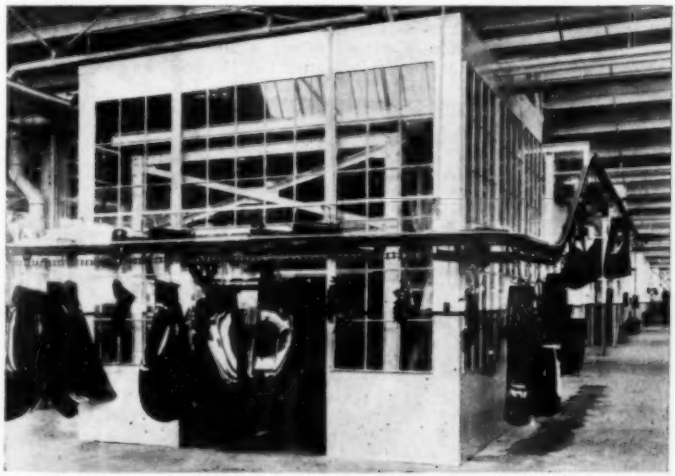
has made America the peer of any nation on earth.

The paint and oil house is built at the seaward end of the company's dock—so situated for expeditious handling of incoming cargoes that arrive from Chester, Penna. via the Panama Canal on Ford-owned steamers. The concrete pit enclosing the oil storage tanks is partly below sea level, and is supported by concrete piles driven in 32-ft. of water. The bottom of the pit is 8-ft. below mean high tide. The floor slab is 21-in. thick; the 12-in. wall of the pit was poured continuously and is without construction joints. A concrete tunnel connects the paint house with the main assembly house adjacent. The pit contains six tanks having a combined capacity of 148,000 gallons. The paints and oils used at the Ford assembly are stored in these under-water-level tanks.

The main floor of the house contains paint-mixing machinery together with modern pumps for running paint through the various pipe lines to the finishing jobs. Warm paint is pumped from the mixer vats through 36,200-lin. ft. of pipe to the preparation and finishing stations. With the exception of the fenders, and wheels, which are dipped in enamel, all finishing materials are applied with spray guns.

The fender enameling is done within a glass and steel compartment 20-ft. wide by 280-ft. long. The fenders are fed on to a hook-and-chain conveyor, or rather a series of conveyors, that move slowly at the rate of 36-in. per minute. One set of fenders goes through the enamel dips, then into the ovens, to emerge at the output end ready to go on the stock line which, in turn, delivers them to the final assembly line.

A fender requires 126 minutes for a complete trip through the



Overhead chain and hook type fender conveyors receiving fenders from enclosed enameling compartment from which they are taken to the final assembly line. This compartment is 280-ft. long.

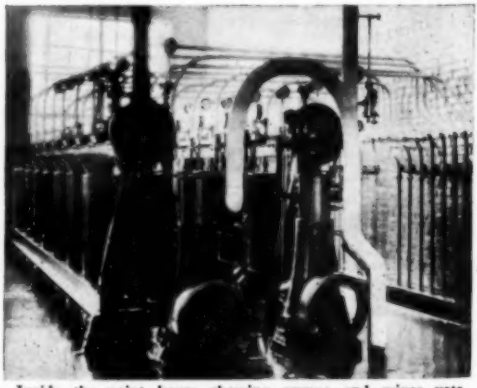
Loading end of enamel burn-off oven straight ahead with paint pipe lines above. The enclosed compartment at left is part of the enameling department.

enameling compartment. Each enameled piece is closely inspected on its journey. Any that are not perfect are rejected and sent through the enamel burn-off oven where, in the presence of heat, and also with acid and brushes, the enamel is removed so the parts can be sent through again for re-processing. The enamel compartment produces 152 complete sets in eight working hours.

The body oven and paint conveyor is of slat type and is 1870-ft. long. It has a speed of 39-in. per minute and delivers 145 bodies every eight hours. Like all others in the plant, it is electrically operated by individual motors.

Nearly all spray work is done inside glass and steel spray booths which are open at two ends. The paint is delivered through pipes from the paint pumps. Connections at the job are tapped by flexible hose couplings which deliver the paint to the spray head. The first trim is a slat type conveyor 132-ft. long with a speed of 44-in. per minute. The spray booths are not covered save for a hood over each which forms part of the fume arrestor containing a suction fan for removing paint gases and odors.

These trim conveyors have been carefully checked and timed to the speed of the operators. Their present speed in the different paint jobs is 44-in. per minute—said to be sufficient for each operator to perform his work without hurry, yet without lost time. The first trim conveyor clears itself in 36 minutes. It has a capacity of six bodies at one time and will turn out 160 bodies in eight hours.



Inside the paint house showing pumps and mixer vats. More than 35,000 linear feet of pipe is used in delivering paint to the various jobs in the Long Beach Ford assembly.

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NO job is too exacting, too delicate for Jonflex, the masking tape with the precision edge.

It can be applied easily and smoothly with maximum adhesion and removed with no sticky "fuzz" remaining. Lacquer-proof and solvent-proof, its protection to covered surfaces is guaranteed.

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Please send free sample roll of Jonflex Industrial Tape and information on the Tape Dispenser.

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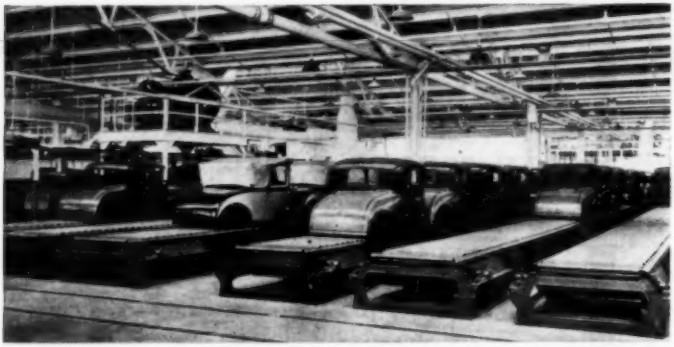


There are seven body storage conveyors of the slat type. The bodies on these lines have been painted and dried.

The second trim is also a slat conveyor, 220-ft. long, with a speed of 44-in. per minute; its capacity is 19 bodies; it clears in 35 minutes and delivers 165 bodies in eight hours.

The solvent line is 190-ft. long—the same type as the first and second trim conveyors—and has also a speed of 44-in. per minute, a capacity of 18 bodies, and delivers 169 bodies per eight hours. The body polishing conveyor system is 220-ft. long, works at a traveling speed of 44-in. per minute, has a capacity of 19, and delivers 165 bodies in eight hours.

Throughout the Long Beach plant, wherever lighting is needed other than sunlight, batteries of Cooper-Hewitt mercury vapor lamps and reflector systems are employed. These lamps had perhaps their greatest success in motion picture work where close-up detail was found to be greatly brought out through their use. The mercury vapor lamps are suspended from overhead rods. Several hundred are stationed throughout the important work areas and wherever good lighting is needed.

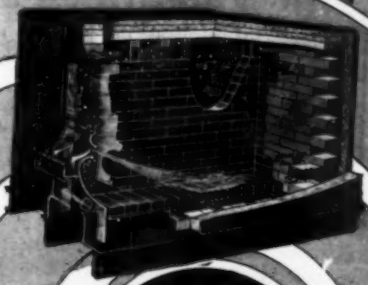
A finished body is placed on what is known as the "finished body storage." This consists of seven slat-type conveyors each with 14 bodies capacity, a total of 98 for the department. Each of the seven lines is 110-ft. long and has a speed of 75-in. per minute. Each eight hours 175 bodies may be delivered, although this finish storage is for keeping bodies until they are ready to go on the build-up line.

The wheel oven, wherein Ford wheels are enamel-baked, is 43-ft. long and carries wheels at a speed of 8-in. per minute. This conveyor is an overhead chain, the wheels being placed on hooks. The oven will clear itself in 80 minutes at regular temperature; at 450° F., in 40 minutes; capacity, 280 wheels; delivery capacity 1680 wheels. The wheel cooling conveyor is a chain and hook type, length 660-ft., speed 11-ft. per minute; clears in one hour and has a load capacity of 280, delivering 1760 wheels in eight hours.

There is a wheel and radiator delivery system for moving finished wheels and radiators to the main assembly line. This de-

An Engineering Triumph!

MODEL 1931 NICHOLS AIR HEATER



NO DIRECT FLAME TOUCHES THE TUBES

Write For Bulletin No. 108

APPROVED BY NATIONAL BOARD OF FIRE UNDERWRITERS

NICHOLS PRODUCTS CORPORATION

12953 Greeley Ave., Detroit, Mich.

NEW YORK CLEVELAND CHICAGO PITTSBURGH PORTLAND, ORE.

Ross Engineering of Canada, Ltd., Montreal, Canada

livery is 245-ft. long and has a speed of 46-ft. per minute. It is an overhead chain and hook type, clearing in 5½ min., with a capacity of 280 items. Daily delivery is 11,200 wheels or radiators. Commercial cars are also assembled at the Long Beach plant. There are two commercial trim and build-up conveyors each 40-ft. long, and having a speed of 7½-ft. each minute. The capacity of each line is four bodies, with a turn-out of 24 bodies each 8-hour day. The line clears in 80 minutes.

Every conveyor in the Ford plant feeds, either directly or through other lines, onto the final assembly which is 560-ft. long, has a speed of 105-in. per min., and delivers a Ford car complete—from the time the bare frame is laid on the line, to a car filled with gasoline and ready to run—in 61 minutes. The capacity of this main conveyor line is 47 cars or trucks. It releases 370 cars each 8-hour day, the present capacity of the Long Beach assembly which, however, is soon to be enlarged to handle greater output.

Crystallizing Lacquers and Synthetic-Gum Finishes

By
W. J. HARTUNG

Foreman finisher with nationally known optical company tells about oven turntable developed for controlling designs of crystallizing finishes, and explains something about the new synthetic-gum finishing materials

DUE CONSIDERATION must be accorded the several different kinds of fancy finishes such as crackle, wrinkle, shrivel, or numerous varieties of crystallizing finishes—all beautiful in their appearance—with shell formation and flower-like or feathered designs at the edges, etc. All these finishes are well adapted for many purposes; their hiding qualities, especially when applied to defective or poorly finished surfaces, brought them to the front as labor-saving materials. Add to this an attractive sales appearance, and you readily understand why these various types of materials are entitled to high commendation.

Again perusing the article in INDUSTRIAL FINISHING, July 1930 issue (pages 13 & 14), "How I Use Crystal Lacquers." I agree with the author in general. His explanations and suggestions, especially in regard to the important factor of securing an even distribution of heat in the oven, are very important.

Turntable in Oven

However, in order to get the best results we installed in our oven a turntable, with shelving, motor driven from the outside—one revolution per minute—so that all parts on the table are exposed to the very same conditions all the time during the

Compressor SATISFACTION

For paint spraying, you can't find an air compressor that is more dependable, more economical in operation, lower in upkeep or longer lived. Quincy Compressors are designed by compressor engineers of long experience and built by a manufacturer who has set his standard high. That is why Quincy Compressors have no time limit guarantee. They must satisfy— for all time.

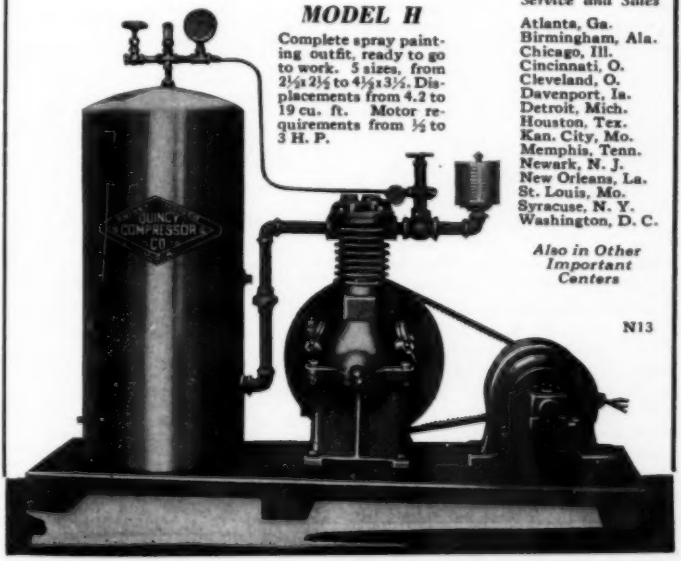
QUINCY Compressors

305 Maine St., QUINCY, ILL.

Make your next compressor a Quincy, for economy and satisfaction. Write for complete details.

MODEL H

Complete spray painting outfit, ready to go to work. 5 sizes, from 2½x2½ to 4½x3½. Displacements from 4.2 to 19 cu. ft. Motor requirements from ½ to 3 H. P.



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N13

process of formation. Thus our work is getting practically the ideal kind of treatment, with the result of much better uniformity in appearance in spite of irregular surfaces.

Our ovens, being 7-ft. by 6-ft. by 5-ft., allow the installment of a 4-ft. diameter revolving standard 6-ft. high, with any amount of suitable shelving. This arrangement gives considerable oven room for developing large quantities of work at the same time.

Before the year of 1910, this crystallizing lacquer had been imported by us from Germany under the trade-name "Troban Lack," the material not being available in the United States.

Within the course of a year or so I happened to discover by accident that Chinese wood oil was responsible for the formation of that peculiar crystallizing effect. When the past unpleasantness stopped all business, I was compelled to do my own mixing and I have continued to do so until our manufacturers tackled the subject, the result mentioned in the beginning—so much for the crystallizing lacquer.

Synthetic Gum Finishes

There is another matter much more important—much more far reaching in the trade. That is the use of synthetic gum (a by-product of many industries) which in its liquid form is a very important factor in the base of baking varnishes and air-drying lacquers . . . a comparatively new product now, in its use for this particular purpose. In some laboratories it has been resting for 15 years without realization of its future value and use. When used as a base in baking varnishes, at a certain temperature, a chemical change takes place which renders the film absolutely insoluble in alcohol and acid.

The use of synthetic gum must not be confused with the idea that it is an inferior substitute of the old-fashioned gum.

In connection with the experimenting with the new product, we have constructed special appliances to test the tenacity as well as adhesion and friction resistance. The new mixture has shown up beyond the slightest doubt a far superior quality from anything we had ever used before. Aside from these tests, a rigorous following up is given as to the finish's resistance to alcohol and acids.

Some large paint and varnish manufacturers are buying these synthetic gums in huge quantities; others are manufacturing their own.

Why Wood Surfaces Hold Paint

"Why Some Wood Surfaces Hold Paint Longer Than Others" is the title of Leaflet No. 62 published by the U. S. Department of Agriculture. This subject is adequately covered by F. L. Browne, Senior Chemist of Forest Products Laboratory, Madison, Wisc. A copy may be obtained from the Superintendent of Documents, Washington, D. C. (Price 5 cents).

Cellulose Acetate Uses

Cellulose acetate is now being made in such quantities that it is available for commercial uses, according to an announcement by the Du Pont Rayon Co. Research chemists, studying the product, state that there are many uses for it in industry besides those to which it has already been applied. It is now being employed in the manufacture of non-inflammable photographic film, cellulose plastics, electrical insulations, electrical condensers, non-shatterable glass, phonograph records, lacquers, and solutions for coating purposes.

One of the more recent uses for it has been for coating wire screen to be used for windows in poultry farms, solariums, and other like places. In these instances its ability to transmit ultra-violet rays is important. It is not inflammable and no special storage is required.

When "Fire Out" Means "Resume Work"

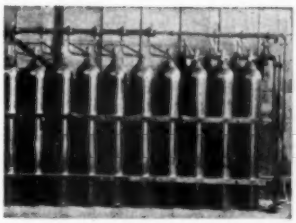
THREE times in the same oven, the Lux System has put out fires so efficiently that work, each time, was resumed within 10 minutes. On a rubber coating machine, Lux has killed six fires without requiring that the coater even be stopped.

When the Lux System does the extinguishing job, the cry "Fire Out" invariably means "Resume Work" for the Lux extinguishing agent will not harm finishing materials, wet electrical equipment, or leave a mess to be cleaned up. Unlike water or chemicals, the Lux System reduces the loss and prevents production delays.

The Lux System smothers fire with carbon dioxide gas. Carbon dioxide is dry, harmless and clean, but fire cannot exist in it.

The free booklet, "Snuffing Out Fire" will give you complete information. Write for a copy.

Walter Kidde & Company, Inc.
140 Cedar Street
New York



A typical Lux System protecting dip tanks and ovens in the Chrysler plant. Systems range from 1 cylinder up depending upon the hazard.

LUX
DRY—HARMLESS
FIRE EXTINGUISHERS

Synthetic-Resin Finishes For Metal Surfaces

By
CLARENCE STEINHOFF

Chemical Engineer in charge of lacquer manufacturing department reveals some interesting and specific information about the characteristics and use of synthetic-resin finishing materials—bake finishes and air-drying finishes

WITHIN THE past year or so new finishing materials—synthetic-resin enamels or, as they are sometimes called, "lacquers"—have shown much promise in industrial finishing.

Synthetic-resin enamels or lacquers have the merit of lacquer in that a rapid finishing schedule may be maintained, and they give a finish with the depth and gloss of oil enamels. In addition to this, they have many outstanding properties that make them superior to the older types of finishing materials.

Adhesion; Chemical Resistant

They have unusual adhesion to all metals, including brass, tin, copper, nickel, zinc, and even aluminum. They also form a film that is highly resistant to chemical action. This film is unaffected by ordinary solvents such as toluol, benzol, gasoline, alcohol, acetone, carbon tetrachloride, and lacquer thinners. They will also resist acids and fairly concentrated alkalies. I have seen one that is apparently unaffected by being placed in concentrated hydrochloric acid for 20 minutes.

This applies to an article finished with one of these materials properly baked. This finish will withstand the action of a 10% caustic solution and 30% nitric acid, as well as 30% sulphuric acid. It is also resistant to the action of hot oils, which makes it an ideal finish for motors and machines that must stand exceptional abuse.

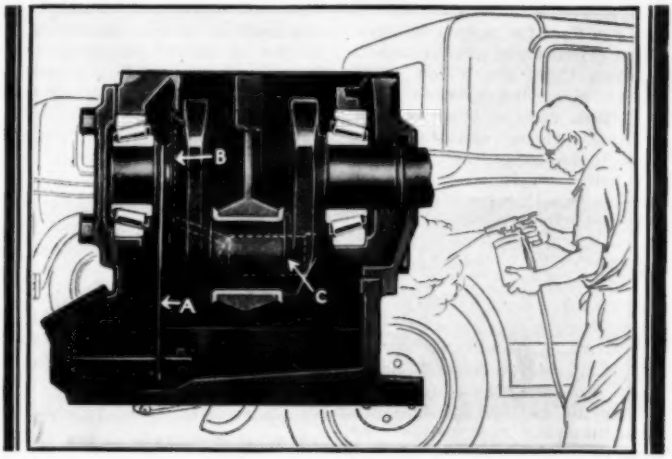
Basic Material

The basic material from which these finishes are made is a resin made by a reaction between glycerine and phthalic anhydride. The resin is modified by the addition of one or more other substances during the reaction. Many types of material can be used as modifying agents, the usual one being a fatty acid, such as oleic acid.

When a finishing material is made of these resins by adding pigments and solvents, and when this material is sprayed onto a surface in a thin film, and then baked a short time, a chemical change occurs; the resin is converted by the heat into a form that is not further softened by more heat and that is now insoluble in all ordinary solvents.

Primer Baked

Now for a few practical applications for this type of ma-



NO OIL SPOILED JOBS

Centro-ring Oiling Keeps Excess Oil Out of the Supply Line

Curtis Compressors provide the surest safeguard against oil in the supply-line by two patented exclusive features of design.

1. The Curtis centro-ring oiling system (Pat. Pending) delivers the exact amount of oil needed to working parts. A ring (A) lifts oil to under-cut groove (B) in crankshaft. Centrifugal force carries it through ducts through chamber (C) in crankshaft. Then centrifugal force redistributes it to ribs in the crankshaft, which lead the oil to each friction point to definitely control volume. No excess to get in the discharge line.

2. The Curtis suction valve type unloader avoids oil pumping due to vacuum. It operates on the suction valve so that when the machine is unloaded, the valves do not operate as with the suction port unloader.

Mail coupon for catalog describing these vital features and the many sizes of Curtis Timken Bearing Equipped Compressors for Paint Spraying, in both stationary and portable types.

CURTIS

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P-1

terial: The first I might mention is as a primer for lacquer finishes. These primers are usually baked, although there are a few satisfactory air-drying primers made from these resins. Most of these synthetic resin materials are made to be baked, and they all give better results when they are baked, although some of them can be used by air drying them. These primers bake in from 30 to 45 minutes at a temperature of from 180° to 200°F.

The figures I am giving in this article are the average of most of the materials on the market. There are a few exceptions to them, but these figures are applicable to most of the synthetic resin materials now on the market. Compare this bake of even 45 minutes to the 1½ hours required for most oil primers used for lacquers. These new primers will also give less trouble from lacquer lifting the primer than is experienced with oil primers. The air-drying primers for lacquer vary in drying time from two to six hours, and can be coated with pyroxylin lacquers in the times given.

Primer—Surfacer

Another type of synthetic material is a combination primer and surfacer. This material eliminates one operation in the finishing schedule. It gives the adhesion necessary to make the finish adhere to the metal to which it is applied and, in addition, it has a high solid content and acts as a surfacer to fill irregularities in the metal.

These materials usually get the same time and temperature of bake as the primers. After baking, they can be rubbed with pumice or sanded with fine sandpaper, either wet or dry, to a smooth surface, after which they are ready to receive one or more lacquer or enamel finishing coats. These surfacers sand very readily and form a very hard, smooth and impervious surface, which holds out subsequent coats exceptionally well.

Finishing Coats

Finishing coats over these primers and surfacers may be either lacquers or finish coats made on the same synthetic resin base. Lacquers, of course, will give a faster schedule if the manufacturer does not bake his finish coats. If the finish coat or coats can be baked, a more durable finish may be produced than if lacquer were used, because of the chemical resistance of the baked resin film. These finishing materials are usually baked from 45 minutes to 1½ hours, and can be had in either gloss, eggshell or dull.

They are satisfactory when baked, but are not so good when air dried, since they usually require several days to lose a tack which they have, and so articles finished with them and air dried cannot be packed for several days after they are finished; so, as far as speed in finishing is concerned, they are no faster than ordinary enamels.

For cheap finishes, one-coat enamels can be had—made from synthetic resins. These will cover the surface satisfactorily in one coat, and have a good gloss. They take the same bake as finishing materials applied over primers, and of course have all the usual advantages of synthetic finishing materials.

Spraying; Thinning

All of the types of finishing materials mentioned in this

It is extravagant not to use

BUTANOL!

No other single lacquer solvent has so many useful properties.

No solvent has such remarkable ability to blend other useful lacquer materials which, without Butanol, could not be used together.

Butanol holds down overhead charges by reducing to a minimum the number of raw materials necessary for the manufacture of any type of lacquer.

Butanol brings down labor charges by simplifying lacquer-making operations.

Butanol is essential to success in lacquer manufacture.

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article are applied with a spray gun. When spraying these materials, they should be handled like nitrocellulose lacquers, rather than as oil enamels, because of their rapid drying. The spray gun must not be allowed to stand idle for any length of time after use without being cleaned out, or the material will dry in the gun, and necessitate taking it apart for cleaning.

Gasoline or turpentine substitute is not very satisfactory for cleaning spray guns used with this kind of material, because most of these resins are not soluble in those materials. Some kind of lacquer cleaning thinner, or toluol, xylol, or solvent naphtha should be used for this purpose.

If these finishing materials, as delivered, are too "heavy" in body to spray readily, most of them can be reduced up to 20% or 25% with naphtha or turpentine substitute. Some few, however, cannot be reduced with those materials, and these few must be reduced with a coal tar solvent such as benzol, toluol or xylol. In order to avoid trouble in using any of these materials, full instructions for their use should be obtained from the manufacturer from whom they are bought.

This article was not written with the intention of giving full instructions in the use of these synthetic resin products, but rather to acquaint you with their possibilities and advantages.

Methanol (Wood Alcohol) Poisoning

I have just finished reading the article in your November number entitled "The Toxic Action of Benzol and Other Solvents" by B. Sanderson; it is both able and timely.

Why not follow with something on the toxicity of methanol (wood alcohol)? I am prompted to make this suggestion by the enclosed editorial which appeared in "The Washington Post" on Saturday last, November 22nd. In any event, you may think well of reprinting that editorial in your next issue.

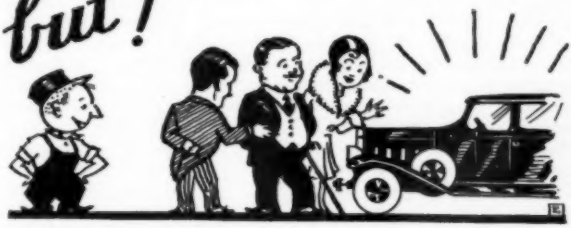
This wood alcohol situation is one that I have personally looked into because of the resolution which was unanimously adopted by the National Paint, Oil and Varnish Association in Toronto last month while I occupied the chair as president of that organization. In my opinion the tremendously increased production and distribution of synthetic wood alcohol this fall called for the enactment of uniform laws and ordinances in order to safeguard the health and lives of the public.

That the medical profession is thinking along similar lines is shown by the enclosed reprints from the "Journal of the American Medical Association" and "Chicago's Health," a publication of the Commissioner of Health of that city. If you are interested, I can probably send you other literature on the subject, although what is being sent now would seem to be sufficient.—H. S. Chatfield, Mac-Lac-Kasebier-Chatfield Corp., New York City.

EDITOR'S NOTE: Excerpts from the clippings Mr. Chatfield sent in are as follows:

"That this poison is as dangerous to human life when inhaled in the form of gaseous fumes or absorbed through the pores of the skin as it is when taken as a beverage seems to be recognized

LACQUER DOESN'T RUN THE CAR ~~~ but!



Lac says to himself, "Funny most people buy cars on looks—a good-looking lacquer-job will sell more cars than a good engine—yet, *look* at most lacquer-jobs!"

The poor appearance of some lacquer finishes is due to the fact that the film was deposited in a porous condition by too rapid drying or that partial precipitation of some of the lacquer ingredients occurred before the film was dry.

If automobile manufacturers employ lacquers whose thinners have been properly formulated with

PENTASOL AND PENT-ACETATE

they will obtain lacquer finishes free from defects due to cheap solvents.

Paying a little more for your lacquer and thinner—"*will pay.*"

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by health authorities everywhere. Cases have been reported in which women and children have suffered harm as a result of using, in closed rooms, quick-drying shellac or varnishes made with methanol. In the great spray process used in automobile factories the spraying is done under hoods and employes wear masks, so that they are protected against the hazards. As is usual in modern industries, the name of the product has been concealed by the bestowing of fanciful names and the average person does not recognize, under the fanciful title, the old hazardous wood alcohol."—*The Washington "Post."*

"Methanol, or methyl alcohol, was until recently produced by the destructive distillation of wood. It is now manufactured from water, gas, and hydrogen ($CO+H_2+H_2=CH_4O$) at a cost which makes possible a large production at a low price. One of the uses for which methanol is well adapted in all respects, except one, is in the antifreeze mixture in automobile radiators. This unfortunate exception to its good qualities consists in the fact that methanol is a volatile cumulative poison. When taken in frequently repeated small doses, methanol induces blindness; in larger doses, whether by the stomach or by the lungs, it may cause death.

"As the coefficient of distribution of methanol between water, or blood, and air is high, by far the greater part of any quantity of methanol that reaches the lungs is absorbed. Unlike ethyl alcohol, methanol is not burned in the body to any considerable degree; and its excretion through the breath and the urine is extremely slow. The toxic dose is not large and is easily reached even when the amount absorbed daily is too small to induce a noticeable initial effect. Contrary to the claims that would minimize its dangers, methanol is quite as poisonous when inhaled into the lungs as when taken into the stomach. Erroneous also is the assertion that, as the synthetic product is almost pure methanol, it is less toxic than the somewhat impure product obtained by the older method of manufacture. The fact is that in any preparation of methanol, pure or impure, the

(Continued on page 72)

Porcelain Enamel Institute

The Porcelain Enamel Institute, Inc., was organized on November 6, 1930, when a representative group of manufacturers met in Cleveland, Ohio. The Institute, which has been formed for the purpose of promoting the progress and development of the porcelain enameling and allied industries will immediately be incorporated under the laws of the State of Illinois, as a corporation organized not for pecuniary profits.

By-Laws of the Institute provide for the membership of enamelware manufacturers, companies supplying porcelain enameled parts and porcelain enamel service to other manufacturers; companies manufacturing iron and steel for the enameling industry; companies manufacturing porcelain enamel frit and enamel for the industry, and companies producing chemicals and other raw material used for the manufacture of porcelain enameled articles. Each of these groups is represented in the charter membership of the Institute.

The idea of the Institute has developed from a paper by R. A. Weaver, read before the February 1930 meeting of the American Ceramic Society, in which was suggested a cooperative advertising program by the porcelain enamel industry. This was followed by several preliminary meetings and culminated in the organization of the Institute on November 6.

Elected officers are as follows: President—R. A. Weaver, vice-president Ferro Enamel Corp., Vice-President and Secretary—R. W. Staud, Benjamin Electric Mfg. Co.; Treasurer—W. E. Hogenson, Chicago Vitreous Enamel Products Co. There is also an executive committee of five members. Thirty-three companies were represented at the organization meeting.

OTHER DOLAN PRODUCTS

Quick Drying Fillers

Wateroil Rubbing Oils
(Eliminate bloom)

X-L All Drawer Coater

Sealacquer

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...you have not learned what it is possible to do with a Wood Stain. WATEROIL is made entirely from water colors, the newest and most practical stain on the market, with universal acceptance almost overnight.

Non-bleeding—non-fading
No raising of grain
No blistering of veneers
Eliminates wash-coating and sanding

WATEROIL may be sprayed, brushed or dipped. Regularly furnished in four standard colors: light and dark walnut, red and brown mahogany. Allow us to prove to you that WATEROIL is really the stain to meet your requirements.

Fully Guaranteed—Try It Out!

V. J. DOLAN & COMPANY, Inc.

Wood finishing materials of "Unquestionable Quality"

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What Has Finish To Do With Sales?

■

Jamestown Wood Finishing Co. products are guaranteed. If they will not do for you what we claim for them your money will be refunded.

■

PLENTY you say—for the finish is one of the things which the purchaser of your product can see—and check to determine its worth. A good finish is more than just an advantage in selling—it is essential to successful merchandising.

To assure that their products will have this dependable finish—large numbers of successful manufacturers of furniture and other wood products are specifying J-W-F finishing products. They find that they produce a finish that is a powerful aid to sales—they like the consistent, fool-proof results obtained and the extra coverage they give. They know they can depend upon them to be up to specifications every time.

J-W-F finishes cost no more than any good finish—and when you consider the results obtained—their actual cost is oftimes less. Let us call and explain in detail—just write our nearest branch.

JAMESTOWN WOOD FINISHING COMPANY

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STAINS · FILLERS · SHELLACS · VARNISHES · LACQUERS · ENAMELS

New Materials and Equipment

Presenting briefly, certain outstanding features of new or improved materials, supplies and equipment which have been developed and made available for use in modern industrial finishing departments

Linoleum Finish—Du Pont

A new finish for the preservation of linoleum has just been brought out by the Paint and Varnish Division of the DuPont Co. It is a water-clear Duco said to be extremely flexible and resistant to dirt and grease, sealing all types of linoleum against the penetration of liquids.

Inasmuch as linoleum itself is quite porous, it readily becomes a dirt catcher as soon as the varnish or lacquer finish rubs off. In this condition it often spots permanently. The new colorless Duco is claimed to be so impervious to moisture that even ink can be wiped off Duco-treated linoleum without damage to the surface, which is guaranteed not to turn white.

Presto Spray Outfit

The Presto Model 126 is the newest addition to the line of spray painting equipment manufactured by Metal Specialties Mfg. Co., 338 N. Kedzie ave., Chicago, Ill. It is speedy, portable, compact, direct-drive outfit for applying both light and heavy materials. The spray gun is a new design of the Presto pressure-feed type, which gives instantaneous, internal atomization. There are no split sprays—no excessive rebound, fog or mist. And the size of spray—the amount of material

"Furnished with 2½-gallon pressure-feed material tank, at a small additional cost."

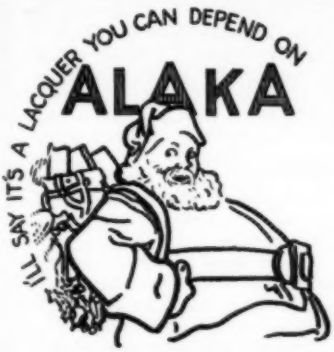
applied—can be instantly controlled from the trigger.

The Presto Model 126 complete, includes compressor, air conditioner, electric motor, pressure-feed spray gun and hose.

Art Caning and Decorating Tool Improved

John W. J. Akermans, 6520 Sterling St., Detroit, Mich., announces an important improvement on the small tool he has developed for finishers to use in "art caning, plastic relief striping, and other exterior and interior decoration" (pages 77 and 78, Sept. 1930 I. F.).

According to Mr. Akermans'



LITTLE JIMMY JONES has the right kind of a family all right. Seems to me his Mother and Dad must have called a meeting or something. Why take that little typewriter they got him, all the keys will be busted long before the black even thinks of chipping off with old age. And that delivery wagon will be fire-wood before the red and yellow finish bites the dust. These kid-things get tough use all right, and Jimmy's people bought him the kind of tricks that will stand the pace. Well, Merry Christmas, folks.

LACQUER & CHEMICAL CORP.

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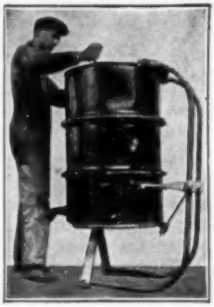
CHICAG *makers of* **ALAKA** **PHILADELPHIA**



TILT-SKIDS

For Vertical Mixer-Drums.

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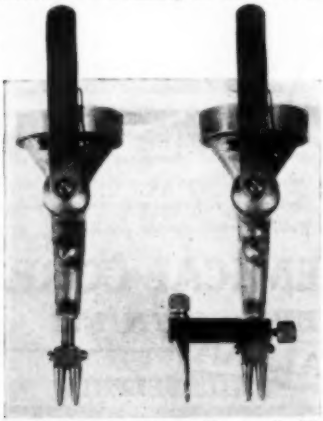
letter, he has "added to the equipment of the apparatus, free of charge, a double nib for applying the double horizontal and vertical fillets in art-caning in one operation and will forward it to previous buyers of the instrument without charge.



The double nib in place, without and with standard guide.

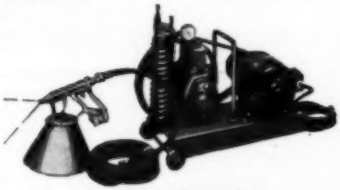
"This device, which is $\frac{1}{32}$-in. center to center, matches the fillets of the standard No. 2 single nib and is also suitable for double striping and other decorating and fits the standard guide.

"The two nibs are removable from the nib holder in case it is desired to use smaller or larger nibs instead, and two set screws are provided on the holder to permit easy cleaning. Special double nib holders of different width, center to center, and special double nibs of various diameters may be obtained . . . . at extra cost."

Portable Airpainting Unit

The Paasche Airbrush Co., 1921 Diversey Parkway, Chicago, Ill., announces its new F612-A portable airpainting unit. This unit has a double cylinder air compressor with a capacity of 4.4-cu. ft. of air per minute. The compressor is operated by a ½-h.p., 110 or 220-volt, 1-phase, 60-cycle motor running at 1725-r.p.m., which supplies a large volume of air pressure that is sufficient for a great variety of airpainting and airfinishing jobs.

According to the manufacturer, this unit is compact, sturdy, light in weight, and is equipped with a Paasche patented, copper, cooling coil with water and oil separator, which provides clean dry air without pulsation, safety valve, gauge and fittings, 15-ft. of electric cord ready to attach to light socket, and 20-ft. of ¼-in. high-pressure air hose with swivel couplings. It can be furnished with either round or fan sprayer adjustable from narrow to wide fan. It is built low and won't tip over, has a metal base, and rubber-tired rollers.



Compact and complete

What is unwise in business? What are the things which cannot be attempted safely? What are the trends and shiftings of the markets for manufactured commodities—both industrial and domestic? Where do dangers lurk? On the other hand, what constitutes sound practice? Through what methods may failure be transformed into success?

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Questions and Answers

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer any further comments, or recommendations pertinent to subjects mentioned

Multi-Color Crystal Finish For Wooden Beads

We have been requested to duplicate on a wooden bracelet the finish appearing on the present popular ornamental wooden beads of multi-colored finish, which appears to have been covered afterward with fine quartz so that on the wearer the beads appear to be changeable in color as the light strikes them differently. We have tried the process of floating enamel colors on water unsuccessfully. Can you instruct us what operations are necessary and advise us what materials to use?—R. M. W., Inc.

Due to the smallness of the sample submitted with this question, I could only make a cursory examination. I found the coating to be fast to the action of alcohol and oil solvents, thereby eliminnating the factor of lacquer or enamel work; but upon the application of an alkaline agent, such as a soda solution, the coating immediately dispersed showing that the covering was composed of a binder and a whiting agent.

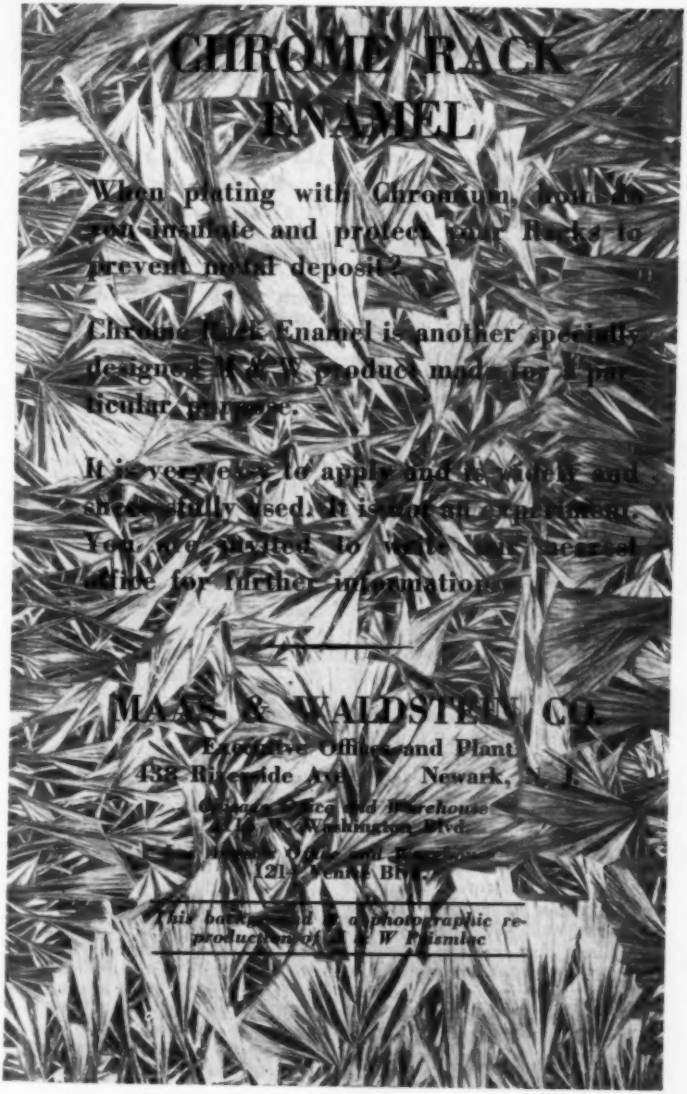
Also I was of the opinion that coating was struck on the wood first and the dye was later printed on the easily penetrated surface. I am acquainted with a chromo-surfacing process which is commonly used in the manufacture of wood and fiber board novelties. I am passing the formula of this process along to you with the hope that it may be of some use.

The mode of manufacture in common use for the making of art and chromo woods consist in the making of a coating solution which will cover the surface evenly and allow the dye to penetrate. The coating solution is composed of Blanc Fixe, mica and gelatin. The former materials constitute the surfacing agents and the later acts as a binding solute.

In preparing the coating paste, it is necessary to strike correctly the proportions of surfacing material and binder. An excess of surfacing material over gelatin would cause a weak coating unable to resist the pull exerted by the coloring solution at the moment of leaving the impression during the printing. On the other hand, an excess of gelatin would cause a patchy or piebald impression to be made. The general proportions of binder and surfacing material used are as follows:

Blanc Fixe	50-lbs.
Mica	40-lbs.
Beach sand (finest siftings)	10-lbs.
Gelatin	18-lbs.

The gelatin is first dissolved in boiling hot water and added to the surfacing materials. The materials are well mixed and suf-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When plating with Chromium, how do you insulate and protect your Racks to prevent metal deposit?
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It is very easy to apply and is widely and successfully used. It is not an experiment. You are invited to write us at once for further information.
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This background is a photographic reproduction of M & W Enamine

ficient water is added to bring the coating solution to a good brushing consistency. The mica and fine sand siftings are incorporated in order to lend the sparkle-like effect to the bead. The sand siftings may be blown against the wet surface previous to the drying, or incorporated directly in the coating solution. The coating is allowed to dry and the following solution is applied:

Alum	5-lbs.
Conc. muriatic acid	5-lbs.
Water	12-gals.

The above solution is applied several times by means of a sponge. It partly serves as a basis for the dye solution and partly prevents smudging by insuring color penetration. The application of the said solution is not an absolute necessity, but to insure best practical results and a finely sealed surface, I advise its application. After the surface processing is allowed to set, the chromo art print is applied. Upon experimentation, I found that basic and spirit dyes give the best results. The more expensive spirit dye possesses better all around fastness qualities.

The color is applied by means of a spiral rotary rubber roll or brush to which the color is fed by ducts, thereby allowing chromo prints of any number of shades in a single process. The color solution is prepared by dissolving 4-ozs. of spirit dye to one gallon of solvent (50% water, 50% denatured alcohol). Spirit dyes of any shade may be obtained from (Name on request). The blanc fixe, mica and finest sand siftings may be obtained from any whiting or pigment manufacturer.

May I offer a suggestion? If the above process is not applicable for your usage, you can submit a few samples of the bead to INDUSTRIAL FINISHING magazine. I will try to work out a formula more suitable to your conditions.—Samuel S. Harkavy.

How to Finish Paintings to Produce Rich Effect

I have several pictures painted with colors over sensitized canvas. I would like to know what liquid (of transparent material) I can use to give them an "oil gloss" appearance, this oil gloss to be rather thick. I have seen several pictures with this so called "oil gloss" and, on rubbing them with my fingers, I found that they smell like "pine"—as though made of some kind of resinous paint or lacquer. Also, over the thick oil gloss that I need, as I said above, I would like to give the pictures some kind of graining appearance, which would make them appear to have the strokes of the artist's brush. Can you kindly suggest materials and tools to make such effects on the pictures so they will look "hand painted"? Also, suggest the lacquer or other liquids or transparent paints you think will produce the "oil gloss" result.—G. Pitoni, International Heraldry Studio.

It is reasonable to suppose that the sample Mr. Pitoni saw was finished with dammar varnish, with a little turpentine. Sometimes it is desirable to add some oil and drops of drier. This material is almost water white and quick drying. After the finish is quite dry, wipe over the surface with a rag dampened with oil. The desired brush-mark effects should be attended to before the gloss coating is applied. Fitch is

the regular tool for it, assuming the paintings are done in oil paint by hand.

In case of a photograph, hand colored by transparent material, it is advisable to have the original made so that it will show that brush-mark effect very strongly by simply having the light located in the proper place and angle while being photographed.

The artists, whose charge for a portrait ranges from $2,000 to $5,000, finish their paintings with imported French varnish. After the painting is finished, it is left in ordinary temperature for two weeks or more to permit it to thoroughly dry, and the first coat of French varnish is spread over with a soft brush, thin but evenly. Two or three days later a second coat is given—this time rather heavy and full coating.

The varnish is of light body, clear golden in color and flows well. Usually it is not sold in bulk, but can be purchased in bottles or cans at any reputable art supply dealer.

Later the whole surface is gone over with a cloth moistened with linseed oil. The finished surface, while glossy, is not too shiny so that it will not mar the effect.

Lithographers prefer prepared spirit varnishes to oil varnish or ordinary shellac, though the latter are used to a small extent.

Ordinary lacquer and clear ——— varnish (name on request), when applied in a heavy coat, will dry up dull, but if sprayed very thin it will give a gloss effect. Of course, there are many gloss lacquers having the necessary amount of oil content. If a thick gloss coat is required, the only method is to go over the surface twice or thrice.—F. S. Araki.

Building Sales for 1931!

The finish will be a sales factor in 1931 .... make sure that your products have that distinctive quality characterized by the use of high grade-finishing materials.

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Standard with many manufacturers of high-grade furniture and cabinet work, impart finished surfaces that are attractive, and durable as time itself. They help to build sales volume and retain old customers. Smooth flowing, faster drying, quick sanding—these materials contribute to speedier finishing schedules at lower costs.

Try Amerilac Nos. 96 and 97, and be convinced. Your Inquiries solicited.

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NON - GRAIN RAISING

Water Stain—

requires ***no sanding . . . . . no wash coat*** . . . . saves 24 hours in the finishing room. One furniture manufacturer saves $1.50 on every dining room suite.

Positively fast to light . . . . made only from water aniline colors. Inquiries solicited. We will be pleased to demonstrate this product or send samples for you to try . . . . Our service department is at your disposal.

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Gives finishes of outstanding Beauty and Distinction

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Coating for Glass to Give Neon Effect

We have been trying for some time to find a material with which to coat glass to give it a neon effect when illuminated from the back side, and are wondering whether you can help us out on this problem. Drying time is not of any importance, but we do want a permanent color. We have read with considerable interest the article by Mr. E. Perry on page 76 of the October issue of INDUSTRIAL FINISHING and are wondering whether some of the non-fading red which he refers to could be used for this purpose?—C.O.S.

The main difficulty may be the rather limited range of transparent colors which could be utilized, because generally pigments of this nature are not as fadeless to continued exposure to daylight as would be necessary in this case—and the same applies to most of the dye colorings. There are only a few exceptions to the fact that those colors, which have been considered stable to light really are stable when used full density, lose that stability when the color is reduced to pale shades and tints. This might become your greatest problem, as you could simulate neon effect only through the usage of clearly-transparent colors, and these of light shades.

However, I still feel that it is perfectly practicable, and so shall offer a few suggestions which may lead your experimentation toward successful channels.

You mentioned that your product would be illuminated from behind; that means there will be more-or-less heat generated and confined within, necessitating

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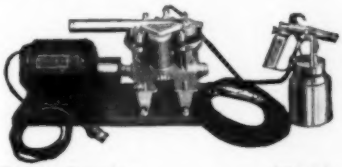

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BALTIMORE MARYLAND

colors, and the binding medium for fixing those colors, which will withstand such heating without fading or flaking off.

As a suitable binder or vehicle under those circumstances my greatest faith would be in using silicate of soda of the proper character for your specific purpose. In the first place, silicate solutions are colorless and clear. Secondly, they are exceptionally adhesive to glass surfaces, partly due to a slight etching of the glass. Bottles on which syrupy silicate solutions have been spilled will often adhere to each other, or to wood or stone shelving, with such tenacity that it is impossible to salvage them.

Also, silicate solutions have been mistakenly used to fasten temporary signs onto polished plate glass windows, and then later very difficult to remove completely. Thirdly, silicate of soda has very high refractory properties and would be altogether unaffected by the maximum heat generated by any lighting condition. In fact, silicate paint is already utilized as a light diffuser in place of frosting on electric lamps, and the preferable method is the application of silicate paints to the inside of the lamp bulbs. It has been found that good adherence of a sprayed coating to the glass can be had on surfaces which are scrupulously clean. The addition of a small amount of ammonia to the paint reduces surface tension and makes adherence easier.

Sodium (and also potassium) silicate is a very alkaline product, therefore your next problem is to select colors known to be resistant to alkali, and to avoid basic pigments (as for instance lead and zinc) which will affect and modify the behavior of silicate solution. With few exceptions, powdered pigments mix readily in liquid silicate medium, although it would undoubtedly be desirable to first grind the colors in the silicate solution or in an aqueous solution of gum arabic. The following stable colors are adaptable with silicates, and although this list is not complete it will serve the present need. These are: Ultramarine and smalt blues; zinc chromate; raw and burnt siennas; Tuscan red oxide; Toluidine red.

All of these are more-or-less "lake" type, i. e., a thin film of color is transparent to transmitted light. Ultramarine, as generally known, is a beautiful shade of reddish blue, but less commonly known to be procurable in a wide range of shades running into

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Manufacturers in all wood-using industries find SAN-ITAI-RIE FILLER unsurpassed in filling cracks, worm holes, knot holes, open joints, dents, pitch pockets, etc., and through its use are able to send out their products without a flaw.

Put up in friction top cans—half pints to gallons—in 20 different colors. Send for sample can.

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Division of

164-170 W. Kinzie St. G. J. Liebich Co. Chicago, Ill.

greenish. I would refer you to the ultramarine factory in South Bend, Ind. For green, you could add a small amount of zinc chromate, which is a very brilliant light yellow of greenish undertone. Good Tuscan red has a very clear undertone similar to wine shade. Toluidine may not be sufficiently fadeless, whereas the new Cadmium red of English vermilion shade may prove to be too opaque for the purpose.

There are other colors to be sought; inorganic lake pigments on a base of barium sulphate are quite satisfactory. But in all cases, as it is property of silicate solutions to set by coagulation, ready-mixed paints cannot be kept long and generally it is advised that they be used within a month from the time of making or mixing. It is not feasible to thin thickened paint with aqueous diluent, because such admixture changes the character of the medium. Some dyes are fast to light, but these should be recommended by the makers, with special reference to their behavior in contact with alkaline liquid silicates.

In conclusion, I might hazard this definite recommendation as the initial basis for your trial:

Procure from the Philadelphia Quartz Co. their N grade of silicate of soda and reduce two parts of this with one part of water. Color this solution as desired, spray or dip the article and let dry over night. Next day, dip into an ammonium chloride solution (of strength say 3-oz. Am. Chlor. in one gallon of cold water) and dry thoroughly, preferably by warming or heating, but not to exceed 200° F. This will act as a binder or mordant of the silicate solution for decorative colors on glass, the reaction rendering

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ANTIQUE
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On
Wood, Metal, Glass,
Composition, Fibre, Paper

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Clamp to *any* tank
and mix *all* liquids

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In addition to our #50 gloss, $1.10 Drawer Lacquer, we are offering #55 Semi-Gloss, and #60 Flat, at $1.25 per gallon drums.

A trial of either of the above mentioned will be convincing that they are fit for many lines of Furniture, as well as perfect Drawer Coater.

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the soluble silicate insoluble. This should be done before washing off the crystallization likely to ensue after the initial application of the silicate.

Finally, I would advise your coating or coloring the inside of the glass rather than the side exposed to weathering. It would be more durable and I believe would also enhance the appearance and lighting effect.—E. Perry.

Methanol (Wood Alcohol) Poisoning

(Continued from page 58)

chief toxic substance is the methanol itself."—*The Journal of the American Medical Association.*

"Pure methyl alcohol is a colorless liquid with a specific gravity of .8021; it has a pungent taste and an odor not very different from that of grain alcohol. A laboratory analysis is required to distinguish it from ethyl alcohol.

"In case of poisoning with wood alcohol there is a period of depression, weakness, and headache, nausea, excruciating pains in the epigastric region, dyspnea and cyanosis, delirium or stupor from which the patient is aroused by pain and vomiting, cold sweats, subnormal temperature, dilated pupils not reacting to light. There may be convulsions just before death. Death usually occurs from a failure of respiration. The symptom which aroused interest in the numerous cases occurring in 1904 was the blindness. Blindness has occurred in a large percentage of the severe cases; it is bilateral, and may set in a few hours after taking the wood alcohol or it may be delayed for several days."—*Chicago's Health.*

The following Preambles and Resolution were unanimously

adopted at the 43rd Annual Convention of National Paint, Oil & Varnish Association, held at Toronto, Canada, October 15-17, 1930:

Toxicity of Methanol

"WHEREAS, in its report for the fiscal year just ending, the alcohol committee has directed attention to the fact that the greatly increased production of methanol (wood alcohol) by synthetic processes may bring about conditions in our industry which will seriously affect the health and lives of workmen engaged in the solvent, anti-freeze, and other fields of commercial activity; and

"WHEREAS, the alcohol committee recommends that this association closely follow developments regarding the toxicity of methanol (wood alcohol) with due regard to the fact that one of the principal reasons prompting Congress to enact the original tax-free denatured alcohol law of June 7, 1906, was to provide the arts and industries with efficient denatured ethyl alcohol formulas which would relieve factory workmen and others concerned from dangers to health incidental to the use of wood alcohol: therefore be it

"RESOLVED, That the alcohol committee be and it hereby is authorized, empowered and directed to continue its investigation relative to the toxicity of methanol (wood alcohol) —natural and synthetic—in connection with commercial uses of interest to the members of this association, with particular reference to dangers from inhalation or skin absorptions, and to report its further recommendations at such time as may be proper in the circumstances."

Removes Rust from Steel

Steel that has rusted can be cleaned by brushing with a paste compound made in accordance with the following formula:

Potassium cyanide	½-oz.
Castile soap	½-oz.
Whiting	1-oz.
Water	Sufficient to form a paste.

Afterward, the steel should be washed with a solution made by dissolving one unit of potassium cyanide into four units of water. Potassium cyanide is a poison.—J. J. B.

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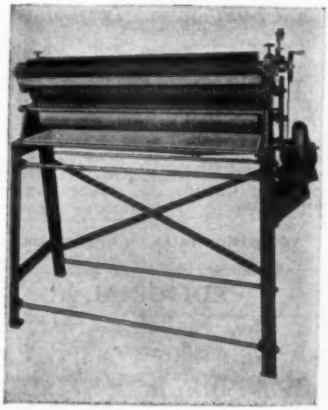
For Applying Lacquers, Enamels, Varnishes, etc.



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EDITORIAL

Progress

Man has always sought easier and shorter methods of accomplishment. He has attempted to control all things physical—and has nearly succeeded. Industry is made up of about 75 percent man power and, being in the majority, men have ruled industry wisely, indifferently or badly according to their knowledge and ability. Precedent, common practice, and accepted methods have long hindered and entangled those who control industry. Conditions and circumstances are forcing a new order of things on those who will survive.

Processes and methods of finishing both wood and metal are changing. There is a decided trend toward shorter processes, faster schedules, fewer coats and consequently quick-drying materials. More finishing is being done mechanically but skillfully and and scientifically.

Confronted overnight by so many new conditions and circumstances, the large users of finishing materials must necessarily become acquainted with the shortest processes and fastest schedules that are practicable without any lowering of quality. Improvements in methods and materials are necessary and desirable, but there are limits which determine the appearance and durability of a finish. A wise manufacturer knows his limits.

Permanently Attractive Finish Adds Value to Cheap Articles

The manufacturer of articles that are put through on a quantity-production basis is forced into close figuring to make his prices right for moving the goods in the face of keen competition. An effective solution of his problem lies not in one particular department or operation, but in perhaps hundreds of elusive places. If he is a manufacturer of wood furniture (or other articles made of wood), his first reaction may be to purchase cheap lumber. Perhaps he may also decide to try a cheap finish. But retrenchment in finishing carries with it an ever present danger. Even if the cheapened finish will last until it is on the floor of the retailer, it will not or cannot last long after it is in the home of the final buyer.

Within the rules of reason, the cheaper a piece of furniture must be sold for, the better should be the finishing, for despite graceful lines or beautiful designs, the finish gives the final appeal to the prospective buyer. He sees it first and he sees it last.

A walnut or mahogany set with an unsightly, cheapened finish that shows poor sanding, and a dull spotted final coat, will not have the sales appeal to the buyer that a pine set, finished with a close-hiding enamel coat will have, although of necessity the retailer must ask a higher price for the natural finished suite.

It should be an axiom in industrial finishing that no good permanent results can be secured from the use of cheap finishes. If they do not cause trouble in the shop, which they usually do, they will cause trouble in the sales department, and after that it will be necessary for someone to make an adjustment for materials which have been spoiled through a desire to lessen costs by a cheaper finish.

Painting and Decorating Vocational Courses

More than 2,300 persons—apprentices and journeymen workers—are receiving instruction in painting and decorating in the United States at the present time, according to Mr. C. E. Rakestraw, of the Federal Board for Vocational Education.

Over two-thirds of this enrollment, Mr. Rakestraw says, is in night schools attended by workers employed at their trade during the day. The day schools, he explained, are intended for the training of boys 14 years of age and over who desire to enter the painting and decorating trade as an occupation, while the part-time and evening schools are maintained for those who are already engaged in this occupation and who desire to improve themselves in their chosen trade.

The instructors in these classes are all highly skilled workmen who have been chosen from the ranks of those employed in the painting and decorating trade, and have been given special teacher-training courses. Such instructors are peculiarly well fitted to impart to others their knowledge of the skills and processes of their trade.

Recent years have seen more relocations in the textiles and allied products industry than in any other, machinery ranking second, lumber and allied lines third, and leather and allied products fourth.

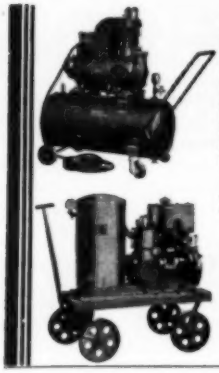
CHRISTMAS

with its joy and good will—why not extend its spirit over the whole year? The fund from the sale of Christmas seals in December will carry help and education against tuberculosis throughout all 1931.

The National, State & Local Tuberculosis Associations of the United States

Buy Christmas Seals

Fight Tuberculosis



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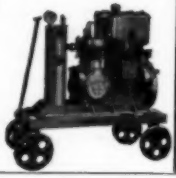
Prove it with 30 days trial

at our risk. Terms only $16 if desired —Paid out of savings.



Hobart Brothers
"Successful Manufacturers since 1893"
BOX F-120 TROY - OHIO

Classified Advertising

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

POSITION WANTED

As finishing foreman. Nine years' experience in charge of finishing pianos and furniture. Thoroughly familiar with modern up-to-date methods. Capable executive; good color man. Now in Wisconsin. Age 32. Address IF-359, care Industrial Finishing.

SALESMEN WANTED

We have several desirable territories open, offering splendid opportunities for the higher type, experienced salesmen, to sell our Industrial Finishing products to both the metal and wood finishing trades. None but men with experience and successful records and a thorough knowledge of the subject will be considered.
Write direct and fully, giving history, experience and former connections. References required. Communications will be held confidential.

The Gilbert Spruance Co.
Offices—Works—Laboratories
Richmond and Tioga Sts.
Philadelphia.

FINISHING FOREMAN AND SALES-DEMONSTRATOR

Desires position as sales-demonstrator for reliable varnish and lacquer house, or will accept position as foreman finisher on store fixtures or high-grade furniture. Best of reference. Address IF-360, care Industrial Finishing.

SALESMAN WANTED

This is an appeal to a real business getter, in the wood and metal industrial finishing field, with a successful record and a loyal and established clientele.

We want a man who has made money, a man who will not ask for more than he can give.

We manufacture a full line of high grade varnishes, industrial undercoats and enamels, air drying or baking, lacquers, clear and colors.

Our plant is located in the East. Our officials are producers with a successful record for over a score of years.

To the right man, an unusual opportunity is offered to tie up with an energetic, progressive, and substantial outfit who will cooperate with him to the fullest extent.

Write us in strict confidence as to what you have to offer and what you want, and an interview will be arranged. Address IF-358, care Industrial Finishing.